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| **CRITICALLY APPRAISED TOPIC** |

**FOCUSED CLINICAL QUESTION**

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| How does the therapeutic alliance mediate conservative treatment of chronic low back pain in decreasing overall levels of disability in a 65-year old female patient with chronic low back using the Oswestry Disability scale and Working Alliance theory of change inventory to measure the influence of the therapeutic alliance. |

**AUTHOR**

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**CLINICAL SCENARIO**

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| The patient was a 65-year-old female who presented with chronic low back pain. She was extremely skeptical of physical therapy as she had seen multiple providers in the past without seeing beneficial results. During the subjective portion of the evaluation she stated that previous providers would passively use modalities (heat and E-stim) and assign her exercises that she believed to be not beneficial. She mentioned that she didn’t feel like they were listening to her and the treatment wasn’t tailored to her. The majority of the evaluation was spent listening to her and explaining the goals we had for her and how therapy can help. She aggreged to giving physical therapy another chance and over the course of her treatment began to see improvements. I think that there are more circumstances where patients write off the benefits of physical therapy due to poor experiences and thus why I believe establishing a good therapeutic alliance could be beneficial in gaining buy in from patients and increasing the rate of positive outcomes with patients who have chronic conditions.  In this scenario the patient had a poor experience with physical therapy and now has associated that poor experience with physical therapy doesn’t work. This requires a clinician to spend far more time with this patient to gain “buy in” and the trust that the interventions the clinician will perform will work. Without this “buy in” the patient is less likely to participate and be accountable for performing her own therapy outside of the clinic. This is what we experienced with this patient as we included her more in her own treatment she began to see benefits from the therapy and was more eager to participate in treatment and completing her HEP. This scenario demonstrates the importance of a good working relationship between the clinician and therapist and how it can positively impact patient outcomes. |

**SUMMARY OF SEARCH**

[Best evidence appraised and key findings]

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| Eight different studies were identified that appropriately met the inclusion/exclusion criteria. The studies included 2 randomized control trials and 6 systematic reviews.   * The key findings were that the therapist patient relationship can greatly impact patient outcomes in patients who are experiencing chronic low back pain. * Personal characteristics of clinicians can influence treatment outcomes either positively or negatively, some of the characteristics that enhanced the therapeutic alliance included clinician interpersonal and communication skills, clinician practical skills, individualized patient centred care, and organizational and environmental factors such as time and appointment flexibility. * The working Alliance theory of Change Inventory (WATOCI) has been found to be a reliable outcome measure to detect levels of therapeutic alliance. * When a positive therapeutic alliance is present patient adherence to treatment is higher |

**CLINICAL BOTTOM LINE**

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| The words clinicians use and the way they formulate a relationship with their patients can significantly influence the treatment outcomes in patients with chronic low back pain. Research suggests that therapists who are empathetic, work together with patients to set goals, individualize treatment plans, and are flexible increase positive outcomes compared to clinicians who do not attempt to form a positive working alliance and don’t include the patient in the treatment plan. A positive relationship has also been shown to improve patient treatment adherence to their home program and plan of care which has also been shown to improve patient outcomes. In summary the relationship the clinician forms with their patient can positively or negatively influence treatment outcomes. |

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| ***This critically appraised topic has been individually prepared as part of a course requirement and has been peer-reviewed by one other independent course instructor*** |

*The above information should fit onto the first page of your CAT*

**SEARCH STRATEGY**

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| **Terms used to guide the search strategy** | | | |
| **P**atient/Client Group | **I**ntervention (or Assessment) | **C**omparison (mediator) | **O**utcome(s) |
| “Low back pain”  “Lumbago”  “Chronic low back Pain” | Conservative Treatment  Strengthening  Stretching  Pain modulation  Non-operative | Therapeutic Alliance  Working Alliance | Disability level  Pain management |

**Final search strategy (history):**

*Show your final search strategy (full history) from PubMed. Indicate which “line” you chose as the final search strategy.*

1. “Low back pain” Or “lumbago” or “chronic low back pain”
2. Therapeutic alliance Or Working alliance OR therapist patient relationship
3. “Conservative treatment” OR “Physical Therapy”
4. **#1 AND #2 And #3**

**(((((Therapeutic alliance Or Working alliance OR therapist patient relationship))) AND ((“Low back pain” Or “lumbago” or “chronic low back pain”)))) AND (("physical therapy") OR "conservative treatment")**

*In the table below, show how many results you got from your search from each database you searched.*

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| **Databases and Sites Searched** | **Number of results** | **Limits applied, revised number of results (if applicable)** |
| **Pubmed**  **CINAHL**  **EMBASE**  **Cochrane**  **Web of Science** | **26**  **19**  **95**  **13**  **50** | **NA**  **NA**  **10 years**  **NA Only one article was relevant here**  **NA** |

## INCLUSION and EXCLUSION CRITERIA

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| **Inclusion Criteria** |
| * Patient population with chronic low back pain previously unable to have results * Systematic reviews and Meta analyses combined or mixed methods studies * Studies describing the influence the therapeutic alliance has on patients’ outcomes * Studies looking at patient responses of what helps form a positive therapeutic alliance * Studies discussing the working alliance between clinicians and patients. |
| **Exclusion Criteria** |
| * Poster presentations * Narrative review articles * Not published in English * Published later than 10 years ago |

**RESULTS OF SEARCH**

**Summary of articles retrieved that met inclusion and exclusion criteria**

*For each article being considered for inclusion in the CAT, score for methodological quality on an appropriate scale, categorize the level of evidence, indicate whether the relevance of the study PICO to your PICO is high/mod/low, and note the study design (e.g., RCT, systematic review, case study).*

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| **Author (Year)** | **Risk of bias (quality score)\*** | **Level of Evidence\*\*** | **Relevance** | **Study design** |
| **Fuentes (2014)** | **PEDro Scale 8/11** | **1b** | **Medium** | **Randomized controlled trial** |
| **Hall (2010)** | **AMSTAR 7/11** | **2a** | **Medium** | **Systematic Review** |
| **Babatunde (2017)** | **AMSTAR 7/11** | **2a** | **Medium** | **Systematic review** |
| **Ferreira (2013)** | **PEDro Scale 5/11** | **1b** | **High** | **Secondary analysis of RCT** |
| **Kinney (2017)** | **AMSTAR 9/11** | **2a** | **Medium** | **Systematic review** |
| **Gardner (2017)** | **AMSTAR 7/11** | **2a** | **Low** | **Systematic Review** |
| **Manzoni (2018)** | **AMSTAR 9/11** | **2a** | **Medium** | **Systematic Review** |
| **Vong (2011)** | **PEDro 6/11** | **1b** | **Medium** | **Randomized Control Trial** |

\*Indicate tool name and score

\*\*Use Portney & Watkins Table 16.1 (2009); if downgraded, indicate reason why

**BEST EVIDENCE**

The following 2 studies were identified as the ‘best’ evidence and selected for critical appraisal. Rationale for selecting these studies were:

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| * **Fuentes (2014) Enhanced therapeutic Alliance Modulates Pain Intensity and Muscle Pain Sensitivity in Patients with Chronic Low Back Pain: An Experimental Controlled Study**   This study has a high 1b level of evidence due to it being a randomized control trial. This study was rated with an 8/11 on the PEDro Scale indicating that it has a low risk of bias. This article looks directly at the effect of a positive therapeutic alliance in patients with chronic low back pain and primarily looked at the context at which physical therapy interventions could be influenced through an enhanced therapeutic alliance. It achieved a low risk of bias due to a well-designed blinded RCT with the use of modalities as the primary treatment effect and 4 distinct groups. The primary patients in the study were patients who had been dealing with chronic low back pain and they looked at the influence an enhanced therapeutic alliance had on pain intensity and muscle pain sensitivity. This study gives good insight into the ability of the effects of a positive therapeutic alliance on a patient’s pain level.   * **Ferreira (2013): The Therapeutic Alliance Between Clinicians and Patients Predicts Outcome in Chronic Low Back Pain** This study has a 1b level of evidence due to it being a secondary analysis of a randomized control trial. There is a moderate risk of bias in this article as it scored a 5/11 on the PEDro scale. This articles primary objective was to look into the effects the therapeutic alliance between physical therapists and patients with chronic low back pain had an effect on patient outcomes. This article was selected because the patients fit the target population and utilized the primary outcome measure in the PICO. This study looks at patients with chronic low back pain who received conservative physical therapy treatment such as general exercises, motor control exercises, and spinal manipulations. This study provided good insight into the ability of a positive therapeutic alliance to improve patient outcomes in patients who are experiencing chronic low back pain. |

**SUMMARY OF BEST EVIDENCE**

1. **Description and appraisal of (Enhanced therapeutic Alliance Modulates Pain Intensity and Muscle Pain Sensitivity in Patients with Chronic Low Back Pain: An Experimental Controlled Study) by (Fuentes et al, 2014)**

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| **Aim/Objective of the Study/Systematic Review:** |
| The objective of this study was to compare a positive therapeutic alliance versus a not well-established alliance and look at the effect it had on pain intensity and muscle pain sensitivity in patients with chronic low back pain while receiving treatment intervention. The treatment intervention was for the patient to receive either active or a placebo interferential current electrical stimulation. |
| **Study Design**  [e.g., systematic review, cohort, randomised controlled trial, qualitative study, grounded theory. Includes information about study characteristics such as blinding and allocation concealment. When were outcomes measured, if relevant]  Note: For systematic review, use headings ‘search strategy’, ‘selection criteria’, ‘methods’ etc. For qualitative studies, identify data collection/analyses methods. |
| * Double-blind placebo controlled randomized control study * Participants were divided into 4 distinct groups through random allocation; The groups included Active Interferential current (IFC) plus limited therapeutic alliance (TA), Sham IFC plus limited TA, Active IFC plus Enhanced TA, and Sham IFC plus Enhanced TA * At the beginning of the study the participants were provided an explanation of the treatment procedure * Level of disability, pain intensity, pressure pain threshold and expectations of pain relief were taken prior to treatment. * The IFC treatment or sham IFC treatment was applied for 30 minutes of treatment * During IFC treatment depending on randomization the therapist would either set the patients up and then leave after 5 minutes of interaction and return to conduct the outcome measures at the end for the limited TA group. For the enhanced TA group, the therapist stayed and engaged the patients in verbal behaviours such as active listening, tone of voice nonverbal behaviours and empathy. * Following the completion of the IFC treatment patients were asked again about pain intensity, expectations of pain relief, and a global rating scale. * TA was measured using the working alliance subscale of the pain rehabilitation expectations scale. * The minimally clinical important difference for LBP was set at 1.5 to 3.2 points for pain intensity. * For Pressure pain sensitivity this was assessed through the use of a calibrated mechanical algometer, Measurements of this were taken over the patient’s erector spinae muscle 4 cm to the right of the spinous process of L4 and were taken on 4 different occasions; 10 minutes before treatment, start of treatment, 15 min into treatment, at the end of treatment. Each occasion consisted of 2 consecutive measurements. * Levels of expectation was measured using the Credibility and Expectancy Questionnaire * The Global rating scale was interpreted by small changes of 1 to 3, moderate changes of 4 to 5 and large changes of 6-7. * A 2-way multivariate analysis of variance test (MANOVA) was used to evaluate the differences in pain intensity and numerical rating scale and pressure pain threshold between treatment groups. TA was also assessed using a MANOVA test. * A Bonferroni post hoc test was used to determine significance between comparisons. * Statistical significance was set at =0.05 |
| **Setting**  [e.g., locations such as hospital, community; rural; metropolitan; country] |
| The University of Alberta Clinical Laboratory |
| **Participants**  [N, diagnosis, eligibility criteria, how recruited, type of sample (e.g., purposive, random), key demographics such as mean age, gender, duration of illness/disease, and if groups in an RCT were comparable at baseline on key demographic variables; number of dropouts if relevant, number available for follow-up]  Note: This is not a list of the inclusion and exclusion criteria. This is a description of the actual sample that participated in the study. You can find this descriptive information in the text and tables in the article. |
| 117 individuals with chronic low back pain were recruited from the local community through advertisements. These individuals met the inclusion criteria which was nonspecific LBP for at least 3 months, mild or moderate level of disability, pain intensity score between 3 and 8 on the numerical rating scale, and between the ages of 18-65. Participants were excluded if there were any contraindications to the using electrotherapy, neurological problems (central or peripheral), currently undergoing other physical therapy or chiropractic treatment, and had previous experience with electrotherapy. They were also asked to not take any medications on the treatment day.   * The characteristics for the group who received active IFC and limited TA interaction are as follows. N=30 with the mean age of 30.5 with 60% female and 40% male. The average pain intensity rating was a 4.0 and an average pain duration of 45.3 months. The credibility questionnaire baseline scores 15.6 average * The characteristics for the group who received sham IFC and limited TA interaction are as follows. N=29 with the mean age of 30.3 with 58.6% female and 41.4% male. The average pain intensity rating was a 4.09 and an average pain duration of 51.1 months. The credibility questionnaire baseline scores 15.2 average * The characteristics for the group who received active IFC and enhanced TA interaction are as follows. N=29 with the mean age of 29.7 with 65.5% female and 34.5% male. The average pain intensity rating was a 4.03 and an average pain duration of 51.21 months. The credibility questionnaire baseline scores 15 average * The characteristics for the group who received sham IFC and enhanced TA interaction are as follows. N=29 with the mean age of 29.8 with 58.6% female and 41.4% male. The average pain intensity rating was a 4.10 and an average pain duration of 47.28 months. The credibility questionnaire baseline scores 16 average |
| **Intervention Investigated**  [Provide details of methods, who provided treatment, when and where, how many hours of treatment provided] |
| *Control* |
| There were two control groups in the study.   * One group received the active IFC treatment for a single 30-minute session. This group also received limited therapeutic interaction by having the therapist spend 5 minutes with the patent during set up to explain the purpose of the study and provide an introduction. The therapist would leave the room during the treatment and return 15 and 30 minutes into the treatment to be present when the tester arrived to perform the outcome assessments. * The other received the sham IFC treatment for a single 30-minute session. This group also received limited therapeutic interaction by having the therapist spend 5 minutes with the patent during set up to explain the purpose of the study and provide an introduction. The therapist would leave the room during the treatment and return 15 and 30 minutes into the treatment to be present when the tester arrived to perform the outcome assessments. |
| *Experimental* |
| There were two experimental groups in the study.   * One group received the active IFC treatment for a single 30-minute session. This group also received an enhanced therapeutic interaction during the first 10 minutes, the therapist asked the patient about their symptoms, lifestyle, and what caused the condition. The enhanced interaction was reinforced through specific verbal behaviours like active listening, appropriate tone of voice and nonverbal behaviours, and empathy. The therapist also remained in the room during the entire treatment session and at the end of treatment provided the patient with words of encouragement. * One group received the sham IFC treatment for a single 30-minute session. This group also received an enhanced therapeutic interaction during the first 10 minutes, the therapist asked the patient about their symptoms, lifestyle, and what caused the condition. The enhanced interaction was reinforced through specific verbal behaviours like active listening, appropriate tone of voice and nonverbal behaviours, and empathy. The therapist also remained in the room during the entire treatment session and at the end of treatment provided the patient with words of encouragement. |
| **Outcome Measures**  [Give details of each measure, maximum possible score and range for each measure, administered by whom, where] |
| * All outcome measures were administered by the head research clinician. * Pain intensity: Measured by the numerical rating scale is an 11-point numerical scale with 0 being the lowest score possible indicating no pain and 11 being the max score indicating high levels of pain. This was administered by the reporting clinician before treatment and immediately at the following of treatment. * Pressure Pain Sensitivity: evaluated through a calibrated mechanical algometer that detects the minimum pressure that induces pain or discomfort in an individual. This measure was taken on 4 different occasions, 10 minutes before treatment, at the start of treatment, 15 minutes into treatment, and at the end of treatment. To remain consistent the measurement was taken 4cm to the right of the spinous process of L4 and the patient was instructed to say stop when pain began. * Therapeutic Alliance: This was measured using the working alliance subscale of the Pain Rehabilitation Expectations Scale. This is a self-reported measure designed to measure the proxy efficacy, motivation/expectations, and working alliance. This measure is 16 items each rated on a 1=strongly disagree, 2=disagree, 3= agree, and 4 strongly agree for a high score of 64 and a low score of 16. This was measured at the end of treatment. * Level of expectations: Patients were asked to rate their expectations of pain relief using the Credibility and Expectancy Questionnaire (CEQ). This measure is comprised of 6 items and 2 different factors. Each item is scored on a scale of 1-9 9 being the most helpful or confident. This was taken prior to treatment and following treatment. * Global Rating Scale: This is a patient reported scale used to assess the degree of change in pain on a 15-point Likert scale. This was taken before and following treatment. |
| **Main Findings**  [Provide summary of mean scores/mean differences/treatment effect, 95% confidence intervals and p-values etc., where provided; you may calculate your own values if necessary/applicable. You may summarize results in a table but you must explain the results with some narrative.] |
| Mean Differences in participants for Muscle Pain Sensitivity and Pain Intensity Scores for the 4 Treatment Groups (Adopted from table 3 Fuentes1)   | **Outcome Measure** | **Group’** | | | | | --- | --- | --- | --- | --- | | **AL (n=30)** | **SL (n=29)** | **AE (n=29)** | **SE (n=29)** | | Pain intensity (PI-NRS), cm |  |  |  |  | | Baseline | 4.01 (0.91) | 4.09 (1.0) | 4.03 (0.92) | 4.10 (1.29) | | Posttreatment | 2.18 (1.17) | 3.06 (1.27) | 0.89 (0.98) | 1.88 (1.44) | | Difference | 1.83 (0.85) | 1.03 (0.65) | 3.13 (0.97)\* | 2.22 (0.75)\* | | % of change (pain reduction) | 45.6 | 24.5 | 77.4 | 54.5 | | Muscle pain sensitivity (PPT), kg/cm2/s |  |  |  |  | | Baseline | 3.89 (1.8) | 3.76 (1.8) | 4.11 (1.8) | 4.5 (2.3) | | Posttreatment | 5.15 (2.6) | 4.16 (1.6) | 6.21 (2.6) | 6.3 (2.8) | | Difference | 1.25 (1.3)\* | 0.39 (0.9) | 2.09 (1.1)\* | 1.75 (1.3)\* | | % of change (increased PPT) | 32.6 | 10.5 | 51.5 | 40.0 |   ‘Group meaning  AL= Active IFC and Limited TA  SL= Sham IFC and Limited TA  AE= Active IFC and Enhanced TA  SE= Sham IFC and Enhanced TA  \*indicates findings that were clinically important differences between groups  This study demonstrates clinically important differences between groups for changes in muscle pain sensitivity and pain intensity rating when there is an enhanced therapeutic alliance. This study demonstrates that the percent change was far larger in the enhanced groups with active and sham IFC current compared to the groups who received limited therapeutic alliance interactions. Demonstrating the effects a enhanced TA has on an individual’s treatment outcomes. |
| **Original Authors’ Conclusions**  [Paraphrase as required. If providing a direct quote, add page number] |
| An enhanced TA when combined with an active IFC demonstrates meaningful improvements in outcomes in patients with chronic low back pain. Enhancing the TA can be beneficial in treating patients with chronic low back pain and in turn fosters a positive relationship between patients and clinicians with regards to the ability of the innervations to be delivered to the patient. |
| **Critical Appraisal** |
| **Validity**  [Summarize the internal and external validity of the study. Highlight key strengths and weaknesses. Comment on the overall evidence quality provided by this study.] |
| The study scored an 8/11 on the PEDro scale  Strengths: This study demonstrates high internal validity, due to the concealed randomization, the characteristics of the participants at baseline were similar, and an effective blinding of the research team and participation. This study also used a standardized testing protocol for each of the groups and the participants.  Weaknesses: The scenario in this study will be slightly different than normal clinical practice which hinders the results somewhat. One of the areas that could be limiting the study is social desirability bias as the patients could have been stating they were better to please the clinician. This study mainly recruited patients who volunteered for the study and the study excluded patients with a more complex clinical presentation. The patients were relatively young average age of 30 years old which may have implications for future use as younger age has been found to be a positive predictive factor for therapeutic alliance to work. Another weakness is that the intervention only occurred with modalities and for one treatment session.  External validity: The patients characteristics were not significantly different, they all had symptoms of similar duration, however they were generally younger and with less symptom complexity which hinders the validity slightly. The results of this study are still beneficial due to the decrease in the patient’s symptoms following the long duration.  In summary, this study demonstrates that an enhanced therapeutic alliance is associated with positive therapeutic benefits. However, due to the similarity of characteristics the participants and the young age the effects of therapeutic alliance should be examined in an older population with more complex chronic low back pain. Another thing that future studies should examine are the long-term effects of the therapeutic alliance has on disability level and overall function. This study is beneficial in demonstrating the acute influence a positive therapeutic alliance has on an individual with chronic low back pain. |
| **Interpretation of Results**  [This is YOUR interpretation of the results taking into consideration the strengths and limitations as you discussed above. Please comment on clinical significance of effect size / study findings. Describe in your own words what the results mean.] |
| The relationship between clinician and patient or therapeutic alliance is a valuable asset in treating individuals who are experiencing chronic low back pain. Through acknowledging psychosocial factors while treating patients this can greatly improve patient outcomes. This study supports the effect a positive therapeutic alliance has on individual patients and the effect treatment interventions has on chronic low back pain. This study demonstrated an effect size of 0.75 which is a moderate effect on pain intensity numerical rating, muscle pain sensitivity, and global rating scale. This study also demonstrated that the placebo effects were larger when individuals received an enhanced therapeutic alliance. In summary this study demonstrates that a positive therapeutic alliance has a positive effect on the treatment outcomes in individuals with chronic low back pain. |
| **Applicability of Study Results**  [Describe the relevance and applicability of the study to your clinical question and scenario. Consider the practicality and feasibility of the intervention in your discussion of the evidence applicability.] |
| This study has moderate applicability to my clinical question because whole it demonstrates a significant effect on patient outcomes when an enhanced therapeutic alliance is established the demographic of patient is younger than my desired clinical question. Negating the age of the individuals this study demonstrates that individuals with chronic low back pain benefit further from treatment interventions when an enhanced therapeutic alliance is established. For this reason, this study is still important and moderately relevant to my clinical question. |

**(2) Description and appraisal of (The Therapeutic Alliance Between Clinicians and Patients Predicts Outcome in Chronic Low Back Pain) by (Ferraira et al, 2013)**

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| **Aim/Objective of the Study/Systematic Review:** |
| The aim of this study was to investigate whether or not a relationship between physical therapists and patients with LBP can predict clinical outcomes of function, perceived effect of treatment, pain, and disability after the implementation of conservative treatment for chronic low back pain. |
| **Study Design**  [e.g., systematic review, cohort, randomised controlled trial, qualitative study, grounded theory. Includes information about study characteristics such as blinding and allocation concealment. When were outcomes measured, if relevant]  Note: For systematic review, use headings ‘search strategy’, ‘selection criteria’, ‘methods’ etc. For qualitative studies, identify data collection/analyses methods. |
| * Retrospective observational study nested within a randomized controlled trial * Patients with chronic low back pain from outpatient physical therapy departments at 3 teaching hospitals in Sydney, Australia * Patients were randomized following baseline measurements and were allocated to 1 of the 3 treatment groups via a concealed envelope. * The 3 groups were general exercises, spinal manipulative therapy, and motor control exercises. * Baseline outcome measures were taken and included Global perceived effect (GPE), Patient Specific Functional Scale (PSFS), pain level using the visual analogue scale, and disability level using the Roland-Morris Disability Questionnaire (RMDQ). * The working alliance theory of change inventory (WATOCI) which measures the alliance was used during the second treatment session * The general exercise group consisted of interventions focused on improving physical function and confidence. This group included strengthening and stretching exercises for the main muscle groups. This was implemented in up to groups of 8 patients. * The motor control exercise group was given exercises aimed at improving the coordination of trunk muscles with the goal to improve intersegmental movement of the spine. * The spinal manipulative group received individual joint mobilizations or manipulation techniques to the spine or pelvis * Each participant received up to 12 treatment sessions over an 8-week period, the exercise and motor control group were encouraged to exercise at home while the spinal manipulative group was encouraged to avoid activities that increased pain. * After completion of the 8-weeks of interventions each individual was assessed with the GPE, PSFS, Pain, and RMDQ outcome measures to measure progress. * Therapeutic alliance was available from 182/240 patients. * A linear Regression model was used to measure the ability of therapeutic alliance to predict outcome and response to treatment looking at the Global perceived effect, function, pain, and disability. |
| **Setting**  [e.g., locations such as hospital, community; rural; metropolitan; country] |
| Outpatient physical therapy departments in 3 teaching hospitals in Sydney, Australia |
| **Participants**  [N, diagnosis, eligibility criteria, how recruited, type of sample (e.g., purposive, random), key demographics such as mean age, gender, duration of illness/disease, and if groups in an RCT were comparable at baseline on key demographic variables; number of dropouts if relevant, number available for follow-up]  Note: This is not a list of the inclusion and exclusion criteria. This is a description of the actual sample that participated in the study. You can find this descriptive information in the text and tables in the article. |
| 182 individuals with chronic low back pain were recruited from 3 outpatient physical therapy departments in Sydney, Australia. The inclusion criteria were nonspecific LBP for at least 3 months and needed to be between the ages of 18 and 80. The patient was excluded if they had known or suspected serious low back pathology such as cancer, infection, fracture or any contraindications to exercise or spinal manipulative therapy.   * The characteristics for the group who received general exercises are as follows. N=59 with the mean age of 54.2 with 56% female and 44% male. The average duration of low back pain in months was 56 months, the score on the WATOCI was 99/112, The scores on the PSFS average were 9.9/30, the average score on the GPE was -2.7, average pain score was 6.5, and disability score on the RMDQ was 13.9/24. * The characteristics for the group who received Motor Control Exercises are as follows. N=61 with the mean age of 52.0 with 53% female and 47% male. The average duration of low back pain in months was 36 months, the score on the WATOCI was 98.6/112, The scores on the PSFS average were 11.1/30, the average score on the GPE was -2.5, average pain score was 6.3, and disability score on the RMDQ was 14.0/24. * The characteristics for the group who received Spinal Manipulative Therapy Group are as follows. N=59 with the mean age of 53.6 with 56% female and 44% male. The average duration of low back pain in months was 84 months, the score on the WATOCI was 96.6/112, The scores on the PSFS average were 10.5/30, the average score on the GPE was -3.1, average pain score was 6.2, and disability score on the RMDQ was 12.4/24. |
| **Intervention Investigated**  [Provide details of methods, who provided treatment, when and where, how many hours of treatment provided] |
| *Control* |
| There was no control group. |
| *Experimental* |
| The interventions were 3 randomized groups to help treat chronic low back pain. The three main interventions in this study were spinal manipulative therapy, general exercises, and motor control exercises.   * The general exercise group underwent a program that included strengthening and stretching of the main muscle groups in a group setting of up to 8 patients per group. The goal for this group was to improve the individual’s physical function and confidence in using the spine and provide education on how to cope with their back pain. They were also encouraged to exercise at home at least once a day. * The motor control exercise group was prescribed exercises that were aimed at improving the coordination of the trunk musculature. The muscles targeted included transvers abdominis, multifidus, diaphragm, and pelvic-floor muscles. They were also encouraged to exercise at home at least once a day. * The Spinal Manipulation group received individual joint mobilization or manipulative techniques to the spine or pelvis. The physical therapist was allowed to choose the dose and techniques used based on the participants clinical features. These individuals were encouraged to avoid pain inducing activities.   Each individual received up to 12 treatment sessions over an 8-week period. |
| **Outcome Measures**  [Give details of each measure, maximum possible score and range for each measure, administered by whom, where] |
| * Patient overall function: measured using the Patient-Specific Functional Scale (PSFS), This is a self-reported measure designed to assess functional change in patients. Patients are asked to rate their ability to perform a functional activity and rate it on an 11-point scale where 0 represents unable to perform and 10 represents able to perform at prior level. The patients were asked to select three of their top activities. * Effect of treatment: Global perceived effect scale (GPE), This scale asks patients to rate how much has their condition improved over a period of time and compares it to when the first episode started. It is a visual analogue scale with scores ranging from -5 (vastly worse) to+5 (completely better). * Disability scale: This was measured using the Roland-Morris Disability Questionnaire (RMDQ). This is a 24-item self-reported questionnaire about how low back pain influences the individual’s activities. Each question is worth one point and can range from a score of 0= no disability and 24= severe disability. * \*Each of these were measured at baseline and at the conclusion of the 8 weeks\* * Therapeutic Alliance: This was measured using the working alliance subscale of the Pain Rehabilitation Expectations Scale. This is a self-reported measure designed to measure the proxy efficacy, motivation/expectations, and working alliance. This measure is 16 items each rated on a 1=strongly disagree, 2=disagree, 3= agree, and 4 strongly agree for a high score of 64 and a low score of 16. This was measured during the second treatment session. |
| **Main Findings**  [Provide summary of mean scores/mean differences/treatment effect, 95% confidence intervals and p-values etc., where provided; you may calculate your own values if necessary/applicable. Use a table to summarize results if possible.] |
| Baseline characteristics of the participants (taken from Table 1 Ferreira4)   | **Variable** | **General Exercise (n=59)** | **Motor Control Exercise (n=61)** | **SMT (n=62)** | | --- | --- | --- | --- | | Age (y) | 54.2 (15.4) | 52.0 (15.7) | 53.6 (14.3) | | Female, n (%) | 56.0 (70.0) | 53.0 (66.3) | 56.0 (70.0) | | Low back pain duration (mo), median (IQR) | 60 (24–206) | 36 (15–120) | 84 (12–162) | | Height (cm) | 164.6 (9.2) | 166.1 (9.7) | 162.7 (8.6) | | Weight (kg) | 75.4 (15.9) | 79.3 (18.3) | 71.5 (13.7) | | Therapeutic alliance (WATOCI) | 99.0 (11.5) | 98.6 (15.3) | 96.6 (14.2) | | Outcomes |  |  |  | | Function (PSFS) | 9.9 (4.0) | 11.1 (4.4) | 10.5 (3.7) | | Global perceived effect (GPE) | −2.7 (1.8) | −2.5 (2.3) | −3.1 (1.9) | | Pain | 6.5 (2.1) | 6.3 (2.0) | 6.2 (2.0) | | Disability (RMDQ) | 13.9 (5.4) | 14.0 (5.3) | 12.4 (5.8) |   Results of Linear Regression Models for the Ability of Therapeutic Alliance to Predict Outcome and Response to Treatment (Adopted from Table 2 Ferreria4)   | **Outcome and Pair Contrast** | **Prediction Model** | **Adjusted Coefficient (95% CI)** | **P** | | --- | --- | --- | --- | | **Global perceived effect** |  |  |  | | Main effect (all participants included) | Outcome | .050 (.024 to .076) | <.000\* | | Motor control exercise vs general exercise | Response to treatment | −.071 (−.134 to −.007) | .029\* | | Motor control exercise vs SMT | Response to treatment | −.062 (−.110 to −.014) | .013\* | | General exercise vs SMT | Response to treatment | −.008 (−.080 to .064) | .834 | | **Function (PSFS)** |  |  |  | | Main effect (all participants included) | Outcome | .095 (.028 to .161) | .005\* | | Motor control exercise vs general exercise | Response to treatment | .028 (−.151 to .206) | .758 | | Motor control exercise vs SMT | Response to treatment | −.116 (−.266 to .034) | .130 | | General exercise vs SMT | Response to treatment | .128 (−.040 to .295) | .134 | | **Pain** |  |  |  | | Main effect (all participants included) | Outcome | −.044 (−.070 to −.017) | .001\* | | Motor control exercise vs general exercise | Response to treatment | .002 (−.068 to .073) | .947 | | Motor control exercise vs SMT | Response to treatment | .035 (−.031 to .091) | .328 | | General exercise vs SMT | Response to treatment | −.032 (−.101 to .037) | .366 | | **Disability (RMDQ)** |  |  |  | | Main effect (all participants included) | Outcome | −.113 (−.166 to −.060) | <.000\* | | Motor control exercise vs general exercise | Response to treatment | .069 (−.077 to .216) | .349 | | Motor control exercise vs SMT | Response to treatment | .045 (.076 to .167) | .440 | | General exercise vs SMT | Response to treatment | .045 (−.090 to .180) | .370 |   Asterisk next to number= clinical significance.  Statistical significance achieved for global perceived effect, pain, disability, and function.  Between group statistical significance for Global perceived effect was significant in the motor control vs general exercise group and the motor control vs Spinal manipulative therapy (SMT) group.  Between group statistical significance for Function (PSFS) was not found to be significant in any of the comparison groups except the overall outcome.  Between group statistical significance for Pain was not found to be significant in any of the comparison groups except the overall outcome.  Between group statistical significance for Disability (RMDQ) was not found to be significant in any of the comparison groups except the overall outcome. |
| **Original Authors’ Conclusions**  [Paraphrase as required. If providing a direct quote, add page number] |
| The therapeutic alliance was shown to have the ability to predict the outcomes of global perceived effect, pain, disability, and function. The therapeutic alliance had the strongest correlation with disability demonstrating that those individuals with a higher therapeutic alliance would demonstrate lower levels of disability. The main finding of this study supports the argument that patients who have more positive interactions with their clinicians have better treatment outcomes. |
| **Critical Appraisal** |
| **Validity**  [Summarize the internal and external validity of the study. Highlight key strengths and weaknesses. Comment on the overall evidence quality provided by this study.] |
| The study scored an 5/11 on the PEDro scale:  Strengths: This studies protocol had proper randomization of their patients and a good design. The characteristics of the individuals were very similar and all underwent the same treatment approach. This study also had a large sample size of 182 patients.  Weaknesses: One of the largest weaknesses was that the therapeutic alliance was taken during the second visit which could have increased the risk for bias during the early treatment sessions. The data analysis was also limited to 8 weeks and did not look into any long-term results. Another limitation is that there was not a control group to compare the results of the therapeutic alliance with. This study was also limited because the average therapeutic alliance scores were already high and could be interpreted as partially bias results. One of the other factors that is a weakness is that the spinal manipulation group was told to avoid activities that provoke pain while the other two groups were encouraged to exercise at home. This could negatively or positively affect some of the effectiveness of the interventions.  External Validity: The patients characteristics were not significantly different, they all had symptoms of similar duration and were treated with the same amount of treatment sessions. There was a large sample size and this study does demonstrate the predictive effects of the therapeutic alliance within 8-weeks however there was no follow up so the long-term effects are unknown.  Overall this study demonstrates that the therapeutic alliance can be a useful tool in predicting patients with chronic low back pain outcomes, however these results should be questioned as majority of the patients demonstrated a high therapeutic alliance within the second treatment session. |
| **Interpretation of Results**  [This is YOUR interpretation of the results taking into consideration the strengths and limitations as you discussed above. Please comment on clinical significance of effect size / study findings. Describe in your own words what the results mean.] |
| A positive therapeutic alliance demonstrates a good ability to predict patient outcomes with measures such as disability, pain, and function. The clinical significance demonstrates that therapeutic alliance has a significant ability to predict the above listed measures and can be helpful in predicting if a patient will respond to treatment. However, the results should be taken with a grain of salt as the majority of the patients already had a high therapeutic alliance score on the WATOCI. Future research should explore a control group that has a low therapeutic alliance score. |
| **Applicability of Study Results**  [Describe the relevance and applicability of the study to your clinical question and scenario. Consider the practicality and feasibility of the intervention in your discussion of the evidence applicability.] |
| This study demonstrates moderate applicability to the clinical question as it does demonstrate that individuals who have a positive therapeutic alliance demonstrate better treatment outcomes. The patient demographic also matches the clinical question as far as age of patients, duration of symptoms, and location of symptoms. The treatment approaches also matched the ones in the clinical question with the conservative treatment. The reason for the moderate applicability is due to the high scores on the WATOCI which could bias the results. |

**SYNTHESIS AND CLINICAL IMPLICATIONS**

[Synthesize the results, quality/validity, and applicability of the two studies reviewed for the CAT. Future implications for research should be addressed briefly. Limit: 1 page.]

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| In conclusion both of the studies demonstrate and support the impact of a positive therapeutic alliance when applying treatment interventions to patients with chronic low back pain. When there is a positive therapeutic alliance this significantly improves patient outcomes with measures such as decreased levels of pain, disability, and improved overall function. Majority of the patients in the study that were exposed to a positive or enhanced therapeutic alliance in the Fuentes study demonstrated significantly improved pain intensity and muscle pain sensitivity compared to those individuals who did not receive the enhanced therapeutic alliance. Treating individuals with chronic low back pain is a difficult and daunting task for even the most experienced clinicians. A positive therapeutic alliance can be a significant tool to help enhance treatment interventions. Therapeutic alliance also demonstrates predictive capabilities as those individuals who scored higher on the WATOCI generally had a better response to the treatment. This demonstrates that applying the therapeutic alliance early in treatment can help the clinician gain a better understanding of how the patient views the working relationship and therefore helps predict patient outcomes.  Some of the limitations of these studies include a small sample size in one of the studies with relatively young patients and scoring high on the WATOCI early on in treatment in the other study. Patients who are younger tend to have better treatment outcomes regardless and by having a high rate of high scores on the WATOCI this leaves out data on those who have a poor therapeutic alliance with their clinician. Another negative for the Ferreira article is that the results did not have a control group or follow the groups for the long-term. The final limitation of these studies is they only briefly provide insight into what makes up a positive therapeutic alliance.  Future research should investigate some of the distinct factors that help explain a positive relationship vs a negative relationship and how to train clinicians to provide a positive relationship. The other area that would be beneficial to explore is the positive therapeutic effect on an older group of individuals and if the effects seen in the younger population can be translated to an older and more disabled population. The final aspect that would be beneficial is a long term follow up to see if there is a carryover effect from the therapeutic alliance. |

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[List all references cited in the CAT]

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