

CRITICALLY APPRAISED TOPIC

FOCUSED CLINICAL QUESTION

For male patients ages 50-60 with chronic low back pain characterized by central sensitization, is hypnosis in combination with typical physical therapy interventions compared to therapy alone more effective in reducing perception of pain (via numerical pain rating or other pain scale)?

AUTHOR

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CLINICAL SCENARIO

JP is a 58-year-old male with a prior military history in which he parachuted from airplanes. Though no trauma occurred, he has sustained significant and debilitating low back pain for more than 20 years. He has repeated physical therapy which has not helped and returned to the VA clinic for one last attempt at conservative treatment before undergoing surgery for spinal stenosis of L5-S1. Well outside tissue healing timeframe, his symptoms were consistent with chronic pain contribution and PT diagnosis of central sensitization. The PICO question was formed to ascertain if treatments other than typical pain neuroscience education, modalities, and physical activity would be effective in reducing pain and improving function.

SUMMARY OF SEARCH

[Best evidence appraised and key findings]

- Three electronic databases were searched and ten studies identified that met the inclusion and exclusion criteria. Results included five prospective random control trials (RCTs), one systematic review, and two quasi-experimental studies. Two of the studies found were reviewed in detail.
- Cognitive hypnosis is a feasible addition to treatment for chronic low back pain and is comparable to commonly used interventions. Both studies included found that hypnosis significantly modulated the pain experience with changes in pain intensity, pain interference, sleep quality, quality of life, disability, and catastrophizing. Both studies found that hypnosis had a similar effect compared to traditionally used interventions.
- Cognitive hypnosis was as effective as biofeedback for treatment of chronic low back pain and when combined with pain neuroscience education (PNE), was found to be statistically superior to PNE in isolation.
- Dosage of hypnosis training does not significantly change outcomes when combined with a home program for practice.

CLINICAL BOTTOM LINE

Current evidence suggests that using cognitive hypnosis for the treatment of patients with chronic low back pain leads to significant and beneficial changes in the pain experience. The patient in question is experiencing chronic LBP and was being treated for central sensitization. When considering interventions for the patient, the therapist should consider hypnosis as a viable option to improve pain intensity, interference, disability, catastrophizing, and therefore quality of life.

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

SEARCH STRATEGY

Terms used to guide the search strategy			
<u>P</u> atient/Client Group	<u>I</u> ntervention (or Assessment)	<u>C</u> omparison	<u>O</u> utcome(s)
“Chronic pain” “Low back pain”	Hypnosis “Complementary and Alternative treatment” “Therapeutic exercise” Exercise Rehabilitation Intervention*		Pain perception Numerical pain rating Visual analogue scale Descriptor Differential Scale of Pain Intensity

Final search strategy (history):

History

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Search	Add to builder	Query	Items found	Time
#13	Add	Search (((("chronic pain") OR "central sensitization")) AND ((hypnosis) OR ("complementary and alternative treatment")))) AND (((("numerical pain rating") OR "pain perception") OR "visual analogue scale") OR "verbal rating scale")	10	13:35:39
#12	Add	Search (((("numerical pain rating") OR "pain perception") OR "visual analogue scale") OR "verbal rating scale")	27622	13:35:17
#11	Add	Search (hypnosis) OR ("complementary and alternative treatment")	14590	13:34:57
#10	Add	Search "verbal rating scale"	858	13:34:18
#6	Add	Search "visual analogue scale"	20444	13:29:52
#5	Add	Search "pain perception"	6551	13:29:26
#4	Add	Search "numerical pain rating"	277	13:29:20
#3	Add	Search ("complementary and alternative treatment")	66	13:28:54
#2	Add	Search hypnosis	14525	13:28:28
#1	Add	Search ("chronic pain") OR "central sensitization"	38692	13:28:12

Databases and Sites Searched	Number of results	Limits applied, revised number of results (if applicable)
Pubmed	10	0 when including “low back pain” therefore expanding search to all types of chronic pain and rendered 10
Cinahl	22	20- All adults
The Journal of Complementary and Alternative Medicine	183	8- Applied limits to topic of Low back pain from the specific journal

INCLUSION and EXCLUSION CRITERIA

Inclusion Criteria

- Peer reviewed article
- Report patient pain level change
- Any study that measures effect of hypnosis impact on pain
- Male, 50-60 years old

<ul style="list-style-type: none"> Chronic back pain
Exclusion Criteria
<ul style="list-style-type: none"> not published in English paediatrics narrative reviews subjects with tumors, trauma, or neuromuscular diseases

RESULTS OF SEARCH

Summary of articles retrieved that met inclusion and exclusion criteria

Author (Year)	Risk of bias (quality score)*	Level of Evidence**	Relevance	Study design
Grondahl (2008) ¹	Pedro RCT: 8/10	1b	mod	Prospective RCT
Pascalis (2008) ²	Pedro RCT: 8/10	2b	mod	Prospective RCT
Vanhaudenhuyse (2017) ³	RoBans: low overall risk of bias	3b	mod	Longitudinal, quasi-experimental quantitative design with between subject comparison; longitudinal data collection; non-equivocal control group design
Boldt I (2014) ⁴	Amstar: 10/11	1a	mid	Systematic review
Edelson (1989) ⁵	Pedro 5/10	2b	low	Prospective RCT
Rizzo (2018) ⁶	Pedro RCT: 9/10	1b	high	Prospective RCT
Tan (2015) ⁷	Pedro: 8/10	1b	High	Prospective RCT
Jensen (2009) ⁸	RoBans: high risk of bias	4	Low	Quasi-experimental study

BEST EVIDENCE

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

Rizzo RRN, Medeiros FC, Pires LG, et al. Hypnosis Enhances the Effects of Pain Education in Patients with Chronic Non-Specific Low Back Pain: a Randomized Controlled Trial. *J. Pain* 2018. doi:10.1016/j.jpain.2018.03.013.

- The level of evidence is high (1b) and it is relevant to proposed PICO question. The study was one of a few that were conducted within the context of physical therapy setting. Additionally, a High percentage of patients completed of study. The interventions were clear and standardized though

heterologous between studies. While it investigated hypnosis in conjunction with pain neuroscience education (PNE), PNE is well established for treatment of chronic low back pain and is used by physical therapist as a standard treatment for chronic pain. The addition of hypnosis to the established protocol is an interesting and relevant topic to consider.

Tan G, Rintala DH, Jensen MP, Fukui T, Smith D, Williams W. A randomized controlled trial of hypnosis compared with biofeedback for adults with chronic low back pain. *Eur. J. Pain* 2015;19(2):271-280. doi:10.1002/ejp.545.

- The study had a high level of evidence (1b) with a low risk of bias. The study looks at multiple hypnosis protocols (2 vs 8 sessions) and compares hypnosis with biofeedback, a commonly prescribed intervention for chronic low back pain. It is more relevant to the clinical question than other studies found.

SUMMARY OF BEST EVIDENCE

(1) Description and appraisal of “Hypnosis Enhances the Effects of Pain Education in Patients with Chronic Non-Specific Low Back Pain: a Randomized Controlled Trial”

Aim/Objective of the Study/Systematic Review:

The study attempts to identify hypnosis effects on the pain experience (intensity, disability, function, catastrophizing, benefits) in combination with pain education compared to pain education alone.

Study Design

Study Design: two arm randomized control trial

Blinding: outcome assessor is blinded to group allocation; participants and therapists delivering interventions were not able to be blinded.

Randomization: Through an excel generated sequence, subjects were allocated to one of two groups. Allocation was concealed from patient and assessor using envelopes and a numbering system. The therapist delivering treatments opened the envelopes to identify group (1 or 2) before sending patient to appropriate treatment session.

Inclusion: non-specific low back pain with greater than three months duration, adults, >3/10 on numerical rating scale

Exclusion: currently in physical therapy, had contradictions to exercise, spinal pathologies, history of spinal surgery, cardiorespiratory illness, pregnancy, hearing issues, heart disease, illiteracy, unable to come to treatment, did not identify LBP as their main issue

Outcome Measures: outcomes were measured at baseline, two weeks and three months. In person assessments were conducted for the first two measures and a phone call was used for follow up data at three months.

Setting

Physical Therapy clinic of Universidade Cidade de sao Paulo, Brazil

Participants

Source: waiting list of the outpatient physical therapy clinic of Universidade Cidade de Sao Paulo, Brazil

Recruitment: not specified

Diagnosis: non-specific, chronic low back pain

Sample: random

N: 270 eligible, 100 randomized, 50 to each treatment

Relevant Clinical Characteristics:

- Duration of symptoms: control (median 50 months); treatment (median 48 months)
- Mean age: control mean 48.4 (12.60); treatment mean 51.7 (14.46)
- Gender: control 36%; treatment: 44%
- NRS average: control mean 7.20 (1.61); treatment mean 6.63 (1.57)
- RMDQ mean: control 13.34 (5.02); treatment 14.88 (5.10)
- PCS mean: control 28.16 (12.83); treatment 28.92 (13.75)
- PSFS mean: control 3.63 (1.80), treatment 4.38 (1.89)
- Global perceived effect: control -2.34 (2.67); treatment -2.29 (2.78)

Intervention Investigated

Control

Where: interventions conducted in classrooms at Universidade Cidade de Sao Paulo, November 2016

What:

- Pain education based on “Explain Pain” Book by Moseley in a class setting with seven per class
- Frequency: four sessions total, twice a week for two weeks
- A workbook was given to reinforce concepts and patients were asked to review material in between sessions

Who: The same physical therapists (PT) conducted education in both control and experiment groups; PTs were employees of the physical therapy clinic.

Experimental

Subjects received PNE with the control group at the physical therapy clinic. Details noted above.

PE + cognitive hypnosis:

- Hypnosis: total of 2 hours and 15 minutes over two weeks
 - Hypnotic topics were in addition to pain education given
 - Topics were covered after PNE group class
- Patient also given hypnosis workbook to read between classes, reviewing information presented in class

Content of hypnosis sessions: Each class related a hypnosis concept to the day’s PNE session. Topics included: possibility of change, analgesic sensations, sensory substitution, spreading comfort, motor responses, progressive relaxation, and adaptive pain responses.

Outcome Measures

Measures were delivered by physical therapist who was blinded to patient allocation at the Universidad Cidade de Sao Paulo (at baseline and two weeks) and via telephone at three months.

Primary measures:

- Pain intensity via Numerical Pain Rating Scale:
 - Average and worst pain in a week
 - Possible scores: 0-10 with 10 being the worst
 - It is highly recommended for chronic pain.
 - MCID: 1 point or 15.0% change⁹
- Disability: Roland Morris Disability Questionnaire
 - 0-24 (24 = 100% disability)

- MCID: 30% change or 3 point change¹⁰

Secondary measures:

- Catastrophizing: pain catastrophizing scale
 - 0-52; 52 is the maximum
 - Each item (13) is scored from 0 (not at all) to 4 (all the time) and summed
 - A reduction of 38-44% is associated with return to work and low pain intensities at follow up.¹¹
- Function: patient specific function scale
 - 0-10; rating is 0 (not able to perform) to 10 (able to perform at prior level)
- Global impression of change: Global Perceived Effect Scale
 - -5 to +5; -5 indicates much worse, 0 is no change, 5 is much better
 - Rates how condition has improved or deteriorated within a time frame

Main Findings

Relevant, general information:

- 95% CI indicated by (_)
- Between group differences calculated with linear mixed models

Primary Outcome Results:

- For the average pain intensity between control (PNE) and treatment (PNE and hypnosis) at two weeks and three months, there was no significant difference at baseline, two weeks, or at three months.
 - At 2 weeks: Mean Difference = .67 (-.27 to 1.62)
 - At 3 months: 0.09 (-0.85-1.04)
- For the lowest, worst pain intensity at two weeks and three months, there was a significant difference between the control and experimental group in lowest pain favouring the experimental group.
 - At two weeks mean difference=1.35 (.32-2.37)
 - At three months mean difference= 1.32 (0.29-2.34)
- For the disability measure (RMDQ), the experimental group reported significantly reduced disability compared to control at two weeks but no difference at three months.
 - Mean difference at two weeks: 2.34 (0.06-4.61)

Secondary outcomes: favoured hypnosis

- Experimental group had a significant change in catastrophizing at three months compared to PNE alone (three months: MD = 6.78 (2.08-11.48)).
- Experimental group had a significant change in global perceived benefits at two weeks compared to control indicating a greater patient perceived benefit from the hypnosis protocol (MD= 1.98 [-3.25-.71])

There was no difference between groups in regards to expectation of improvement between groups. Nor was there a significant difference between groups in regards to adverse effects with both groups having nearly no negative effects from treatment.

Original Authors' Conclusions

Compared to pain education alone, hypnosis and pain education were able to reduce worst pain intensity, disability, and improve global perceived benefits. The results were sustained at follow up months, favouring the hypnotic experimental group. The author concludes that the pain experience is influenced more through the addition of hypnosis compared to pain education alone.

Critical Appraisal
Validity
<ul style="list-style-type: none"> • Pedro Scale 9/10; YES eligibility criteria were specified; YES subjects were randomly allocated; YES allocation was concealed; YES groups were similar at baseline; NO subjects weren't blinded; NO therapist administering treatment was blinded; YES assessors of outcomes were blinded; YES measures of one outcomes obtained from >85% of subjects; YES all whom outcome measures were available received control or treatment as allocated; YES results of between group stats comparisons are reported; YES the study provides point measures and measures of variability for >1 outcome • Strengths of this trial was the blinding of the assessor, blind allocation of the subjects, high attendance and low drop-out rate. Interventions were consistent and easily repeatable as they were well defined, and outcome measures are established means of measuring factors under study (i.e. pain intensity, disability, etc). Additionally, the sample size and power were suitable to detect effect and it had a priori study design. • Weaknesses of this trial was the inability to blind patients to treatment being received or therapist administering treatment. Patients in experimental group had more face time with therapist which may have confounded results.
Interpretation of Results
<p>The addition of hypnosis to pain education appears to be significantly superior in terms of reducing pain intensity, catastrophizing, and disability. While significant, it's questionable how clinically meaningful the differences noted in the study were. The Minimal Clinically Important Change (MCID) for pain intensity is -1 points and the mean difference between control and experimental group was less than two for average pain intensity. Likewise, the MCID for RMDQ (for disability) is -3 points yet the MD between groups was 2.34 (SD 0.06-4.61). All values were below the MCID for their respective measures. The study did not report the effect size of either treatment on pain experience. Measuring the magnitude of difference would have added depth and meaning to the results, indicating that treatments had a clinically meaningful impact on pain. However, due to low adverse effects and moderately different improvements of the experimental group however, I would conclude this is a beneficial, non-harmful treatment which can be added onto typical treatment of chronic low back pain.</p>
Applicability of Study Results
<p>The majority of subjects were women and were younger than the patient in question. He has a history of chronic LBP for 20 years while most participants in this study had four years of pain (50 months). These differences have an unforeseeable impact on results. I would hesitate to apply this study's outcomes to him based on this study alone. Using hypnosis is also practically difficult. The therapist who administered hypnotic suggestions was trained and had extensive experience in this field. His expertise is difficult to replicate and it is not known how novice therapist's administration of hypnosis impacts patients.</p>

(2) A randomized controlled trial of hypnosis compared with biofeedback for adults with chronic low back pain by Tan, Rintala, Jensen, Fukui, Smith, Williams, 2014

Aim/Objective of the Study/Systematic Review:
<p>The main objective of this study was to identify if hypnosis is more effective than biofeedback for treatment of chronic low back pain. Secondary goals sought to find the minimum number of hypnosis training sessions needed for outcomes, to observe if practice impacts outcomes, and to see if benefits lasted beyond short term (three months).</p>

Study Design
<p>Design: Randomized control trial with four groups, single-blind</p> <p>Blinding: study coordinator did not know which group participants were assigned</p> <p>Allocation: randomly assigned by therapist using table of numbers to one of four groups</p> <p>Outcome measured: at baseline, at completion of study (eight weeks), at six months post interventions</p> <p>Inclusion criteria:</p> <ul style="list-style-type: none"> • Chronic low back pain longer than six months • Average pain >5 on 0-10 NRS scale in the last week • Pain with musculoskeletal aetiology • Agreement to adhere to protocol <p>Exclusion criteria:</p> <ul style="list-style-type: none"> • Pain due to recent injury (acute pain) • Neuropathic pain aetiology • Severe psychopathology, cognitive deficits, hearing loss • Active substance abuse • Participation in a previous hypnosis study <p>Statistical Analysis: used means and standard deviations, effect size within group (cohen's d), effect size between groups (cohen's d), repeated measures (ANOVA) for time effect and time and group effect.</p>
Setting
MEDVAMC; Baylor College of Medicine
Participants
<p>Source: patients at the Michael E. DeBakey VA Medical Center</p> <p>Recruitment: posters in the Michael E. DeBakey VA Medical Centre Pain Management Program, staff at the pain center, advertisement in the veteran newsletter</p> <p>N =159 qualified; 59 withdrew before randomization; 100 veterans completed</p> <p>Diagnosis: chronic low back pain</p> <p>Duration: Not specified</p> <p>Average age: 55 (25-83)</p> <p>Gender: M (79%) F (21%)</p> <p>Race: white (47%) African American (32%), Hispanic (15%), other (6%)</p> <p>Pre-treatment group equivalency: t-test indicates no significant difference at baseline between treatment and control groups on any measure taken at baseline</p>
Intervention Investigated
<i>Control</i>
<p>Intervention: Subjects received eight sessions of biofeedback in which electrodes placed on frontalis muscle monitored muscle activity with feedback displayed on a computer screen. Subjects used visual feedback to decrease tension and were told that decreasing frontalis tension would decrease tension in their back and experience global relaxation. Unknown how long each session was.</p>

Administrator: not specified

Experimental

Seven hypnosis suggestions were provided to all groups and included: deep relaxation, sensory substitution, pain intensity reduction imagined anaesthesia, decreased pain unpleasantness, managing breakthrough pain, post-hypnotic suggestions. Unknown how long each session was.

Administrator: a physical therapist with “extensive experience” using hypnosis for chronic LBP

Groups:

- Eight session hypnosis without homework: had a total of eight face-to-face sessions with instruction on seven hypnotic suggestions in first two days; two self-selected suggestions were used in remaining sessions.
- Eight session hypnosis with homework: had a total of eight face-to-face sessions with instruction on seven hypnotic suggestions in first two days; two self-selected suggestions were used in remaining sessions. This group had additional reinforcement of principles through audio-recordings and were asked to practice with and without audio for the eight weeks of treatment.
- Two session hypnosis with homework and weekly check in: initial two sessions were face-to-face with therapist, learning seven hypnotic suggestions. Weekly check-ins were designed to problem solve and encourage practice. Practice was identical to the “eight session with homework” group with reinforcement of principles via audio recordings and instructions to practice with and without audio for the eight weeks of treatment.

Outcome Measures:

Measurements completed at pre, post treatment and at six months:

- Modified Brief Pain Inventory: able to capture intensity and interference of pain¹²
 - Test/retest reliability: excellent (ICC =0.98)
 - MCID: ~2 points corresponding to 32.3-34.2% reduction from baseline¹³
 - Administered: at baseline, post treatment, and at six months; administered by blinded assessors in person for pre and post treatment and over the phone at 6 months
- Pittsburgh Sleep Quality Index¹⁴
 - Internal consistency: Cronbach’s alpha: >0.70; adequate
 - Scoring: calculated by summing 7 component scores ranging from 0-21 with lower scores meaning better sleep quality
 - MCID: >3 points change¹⁵
 - Administered: at baseline, post treatment, and at 6 months; administered by blinded assessors in person for pre and post treatment and over the phone at 6 months

Main Findings

Hypnosis vs control: pre to post treatment

- All hypnosis groups significantly improved in pain intensity from pre to post treatment ($t=8.46$)
- Hypnosis had a large effect for all hypnosis groups in pain intensity and interference (Cohen’s $d = 1.074, 0.887$ respectively) and medium effect for sleep quality ($d = 0.494$).
- BIO-8 had a smaller effect on all measures compared to hypnosis (Cohen’s d intensity = 0.554; interference = 0.498; sleep=0.340).
- In the hypnosis group, time had a different effect on pain intensity and interference. Intensity improved more over time than interference. For intensity, $F(df)=4.29$ while pain interference $F(df)=3.94$. The effect size, however, was not significant for either group.

Comparison of hypnosis effects across groups

- There was a significant difference between treatment groups at baseline for pain intensity but not for other outcome measures ($\eta_p^2=0.081$)

- All treatment groups had significant changes from baseline to post-treatment. All groups had large effect size on pain intensity and interference (Cohen's $d > 0.8$) except for sleep quality (8 session hypnosis $d = 0.425$ and two-session hypnosis group $d = 0.46$).
- For pain intensity, participants in combined practice and education groups were found to be 1.45 times more likely to have 30% improvement in average intensity.
 - Hyp8: 40%
 - Hyp8 prac: 52%
 - Hyp-prac 2: 64%

Comparison of maintenance effects:

- For pain intensity, both hypnosis groups and the biofeedback control had relatively good maintenance of effects from post treatment assessment to six months later. ANOVA indicated large time main effects, however, meaning that time impacted scores across treatment and control groups ($N_p^2 = 0.241$). Differences in how time impacted outcomes was not significant between groups ($N_p^2 = 0.028$).
- For interference and sleep quality, results were similar with a large and significant effect with time yet insignificant differences between the treatment and control groups.
 - Main effect for Pain intensity: $N_p^2 = 0.178$
 - Time x group effect for intensity: $N_p^2 = 0.040$
 - Main effect for sleep quality: $N_p^2 = 0.127$
 - Time x group effect for sleep: $N_p^2 = 0.021$
- Comparison between hypnosis groups (8, 8P, 2P)
 - All groups had large, significant time main effects in all outcome measures meaning time significantly impacting score results regardless of dosage (8 session, 2 session, 8 session and practice). All groups had a non-significant time x group interaction effect meaning that regardless of which treatment group a subject was in, the effect of time impacted their outcomes about the same.
 - Intensity: time main effect $N_p^2 = 0.376$; time x group $N_p^2 = 0.022$
 - Interference: time main effect $N_p^2 = 0.366$; time x group $N_p^2 = 0.025$
 - Sleep quality: time main effect $N_p^2 = 0.232$; time x group $N_p^2 = 0.016$

Original Authors' Conclusions

Hypnosis was more effective than biofeedback in pain relief, though sleep quality and pain interference were not significantly different between treatment and control groups. When comparing outcomes between treatment groups, the author found insignificant differences between groups, concluding that hypnosis can be delivered in two sessions (with home practice) as effectively as eight sessions. All groups maintained the benefits of treatment over six months for pain intensity and interference.

Critical Appraisal

Validity

PEDro Scale Score: 8/10 based on eligibility criteria: Yes; Random allocation: Yes; concealed allocation: yes; baseline comparison: yes; blinding of subjects: no; blinding of therapist: no; blinding of assessors: yes; >85% participant outcomes: yes; intention to treat analysis: yes; between group comparison: yes; point measures: yes

Strengths of this study was the blind allocation; assessments were conducted by a coordinator who did not know which group subject belonged to; randomization of subjects to groups; and use of a control. It was the only study the writer found that investigated dosage and practice effects on outcomes as well as long term maintenance of pain relief following hypnotic treatments. It used effect size for outcomes, lending clinical relevance to interpretation of results.

Weakness: The study used an active control group which makes it difficult to see how much hypnosis impacted pain. Additionally, hypnotic concepts like progressive relaxation were incorporated into the control treatment so difference in outcomes between the control and hypnotic groups is likely not as

significant due to the blended and similar interventions. Finally, there was a high dropout rate (37%) though a large portion withdrew before start of randomization.

Interpretation of Results

This writer concluded that hypnosis is as effective as biofeedback for pain intensity and interference reduction in chronic low back pain (Cohen's $d=1.074$; 0.887 respectively). Because there was not a significant difference in effect between hypnosis groups and the study used several outcome measures and time frames to measure change, the writer would agree with the author that less frequent hypnosis (2 sessions vs 8) did not impact effectiveness of treatment when combined with practice. Minimal clinically important differences (MCID=2-point change) were achieved for both control and experimental groups in regards to pain intensity and interference indicating that the interventions had a meaningful effect on pain experience.¹³ Cautionary confidence in the study is appropriate as interpretation of its results is skewed by the high drop-out rate and no other studies that have attempted to test the same hypothesis. The control group, biofeedback, also included education on relaxation techniques with advice to incorporate relaxation into daily life. This construct is a component of hypnosis and therefore true success of hypnosis might have been attenuated by success of control group. Additionally, subject demographics were not representative of the larger population.

Applicability of Study Results

While the specific demographics of this study was cited as a weakness for generalization of results to population, the subject characteristics were similar to the patient in question. The mean age of the population was 55 and the majority were male. All had a chief complaint of chronic low back pain and had military backgrounds. Based on the characteristics of individuals, the results are highly relevant. Because the study found that two sessions of hypnosis with home practice was as effective as eight sessions, the intervention is also feasible in the clinic. Low dosage of hypnosis can be a cost-effective method used for compliant patients who are willing to apply concepts at home.

SYNTHESIS AND CLINICAL IMPLICATIONS

Evidence synthesis:

Chronic pain is quickly becoming a national epidemic. Estimates of its prevalence rise to 40% of United States adults with costs well beyond \$630 billion annually.¹⁶ It is more common than diabetes, heart disease, and cancer combined.¹⁶ The most common type of chronic pain is low back pain (LBP) and is associated with significant disability, use of healthcare dollars, and linked to mental health issues such as depression.¹⁶ Until recently, treatment has been largely medical with prescription of opioid pain medicines. The latest pain neuroscience emphasizes a biopsychosocial approach incorporating methods to address central and peripheral contributions to pain response.¹⁷ While some interventions (like education, biofeedback, and physical activity) have been well researched, hypnosis has only just begun to be evaluated for clinical use of modulating the pain experience. The current evidence suggests that hypnosis alone and in combination with other treatments impacts the pain experience of those with chronic low back pain.^{6,7,18} There are few high quality, current studies observing the effects of hypnosis on chronic low back pain. The studies reviewed used RCT design with blind allocation, blind assessors, and well-defined protocols.

The studies selected were two random control trials evaluating the effects of hypnosis in patients with chronic low back pain. Rizzo et al observed the effects of pain education combined with cognitive hypnosis for modulation of pain intensity, disability, catastrophizing, function, and global impression of change.⁶ The results indicate that in comparison to PNE alone, hypnosis and PNE have a greater impact on pain experience. Tan et al compared hypnosis alone with a typical chronic pain treatment, biofeedback.⁷ Interestingly, the study also observed the impact of dosage, practice, and whether results were maintained long term (six months). Similar to Rizzo's study, he found that hypnosis is more effective than biofeedback in pain intensity and that dosages did not significantly impact outcomes. Like

Rizzo's outcomes suggested, Tan found that the hypnotic groups maintained the benefits of treatment long term with similar effects as other treatments commonly used for chronic LBP.

Overall, there is good evidence that hypnosis is a beneficial addition to the plan of care for chronic low back pain. Adding it to PNE enhances its effects as shown by modulation of the pain experience. Low dosage, when accompanied by home programs, is an acceptable means of delivery. Furthermore, the maintenance of beneficial effects is as good as other commonly used treatments (biofeedback).

Clinical implication:

The clinical implication of the reviewed studies is that hypnosis, when added to established treatments for chronic low back pain, results in improved pain experience. Not only does it enhance the effects of typically used interventions (PNE), but it can be used in low dosages while maintaining benefits.^{6,7} This makes implementation into the average clinic more realistic. However, because all the interventions required patients to adhere with a home program, the effectiveness of hypnosis was directly tied to patient compliance. Additionally, the therapists who taught hypnotic suggestions were considered experts and had extensive experience and training. It remains unknown how therapists' level of skill and experience impacts patient outcomes. Without experience and training, PTs may not be effective in training patients in hypnotic techniques. Unfortunately, hypnosis is not taught in the typical physical therapy curriculum. To the writer's knowledge, hypnosis training is not currently a CEU nor are classes readily available or affordable. Additionally, because there was heterogeneity in implementation of hypnosis, it is difficult to compare between studies and identify which method was more effective (PNE+hypnosis vs hypnosis alone).

Regarding the focused clinical question and patient scenario presented at the beginning of this paper, hypnosis is a feasible option for chronic low back pain treatment. Rizzo et al. study had subjects with mean age of 51.7 and shorter duration of pain (median 48 months).⁶ Tan et al conducted the study at a VA, and similar to the clinical case, subjects were largely middle-aged men with a history of long-lasting, service-related low back pain.⁷ Both studies were conducted in an outpatient physical therapy clinic by a physical therapist. The studies' setup and demographics are directly translated to the patient scenario. However, because hypnosis was as effective as biofeedback and its use with PNE did not make a clinically significant difference over other treatments (as noted by MCID results), patient preference should drive choice of treatment. While hypnosis is an interesting and effective addition to pain treatment, it is important to let patient centred care guide one's practice.

Implication for future research:

Future studies should investigate whether results are generalizable to other therapists having variable degrees of experience with cognitive hypnosis. The studies should be repeated with different subject demographics to increase applicability to the general population. Further studies on hypnosis dosage would lend reliability to results. Because of the heterogeneity of hypnosis content and education, it is difficult to compare between studies. An established protocol should be tested and similar language and information included to increase homogeneity and comparability between studies.

While Rizzo's study examined the impact of hypnosis and PNE compared to PNE alone, research has shown that PNE in combination with other treatments is most effective.¹⁹ Future studies should compare hypnosis + PE with PE and another treatment (such as graded imagery or manual therapy).⁶ Rizzo et al suggests that the reasons why hypnosis works should be evaluated as it is unclear how it impacts outcomes.⁶ Finally, the writer has observed that patients have difficulty accepting hypnosis as a viable treatment. Examining how acceptability by the patients impacts hypnosis outcome would lend to its clinical applicability.

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