

# Hypnosis as an approach to control pain and anxiety in knee pain: A multiple case report

A hipnose como abordagem para controlar a dor e a ansiedade na dor no joelho: Um relato de múltiplos casos

Hipnosis como enfoque para controlar el dolor y la ansiedad en el dolor de rodilla: Un informe de múltiples casos

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## Abstract

This scientific study explores the efficacy of hypnosis as a therapeutic intervention for managing both pain and anxiety associated with knee pain. The research adopts a multiple case study design, investigating the experiences of individuals suffering from knee pain who underwent hypnosis sessions. The study aims to assess the impact of hypnosis on pain perception, anxiety levels, and overall quality of life in a diverse sample of participants. Methodological rigor is maintained through the use of standardized pain and anxiety assessment tools, longitudinal data collection, and qualitative interviews. Preliminary findings indicate a promising reduction in both pain and anxiety, suggesting the potential of hypnosis as a complementary approach in the multidimensional management of knee pain. The implications of these results for clinical practice and future research avenues are discussed, emphasizing the need for further exploration of hypnosis as a viable therapeutic option in pain and anxiety management.

**Keywords:** Hypnosis; Pain; Knee pain; Anxiety.

## Resumo

Este estudo científico explora a eficácia da hipnose como uma intervenção terapêutica para o controle da dor e da ansiedade associadas à dor no joelho. A pesquisa adota um projeto de estudo de casos múltiplos, investigando as experiências de indivíduos que sofrem de dor no joelho e que foram submetidos a sessões de hipnose. O objetivo do estudo é avaliar o impacto da hipnose na percepção da dor, nos níveis de ansiedade e na qualidade de vida geral em uma amostra diversificada de participantes. O rigor metodológico é mantido por meio do uso de ferramentas padronizadas de avaliação da dor e da ansiedade, coleta de dados longitudinais e entrevistas qualitativas. Os resultados preliminares indicam uma redução promissora tanto na dor quanto na ansiedade, sugerindo o potencial da hipnose como uma abordagem complementar no gerenciamento multidimensional da dor no joelho. São discutidas as implicações desses resultados para a prática clínica e os caminhos para futuras pesquisas, enfatizando a necessidade de explorar mais a hipnose como uma opção terapêutica viável no controle da dor e da ansiedade.

**Palavras-chave:** Hipnose; Dor; Dor no joelho; Ansiedade.

## Resumen

Este estudio científico explora la eficacia de la hipnosis como intervención terapéutica para controlar tanto el dolor como la ansiedad asociados al dolor de rodilla. La investigación adopta un diseño de estudio de caso múltiple, investigando las experiencias de individuos que sufren dolor de rodilla y que se sometieron a sesiones de hipnosis. El estudio pretende evaluar el impacto de la hipnosis en la percepción del dolor, los niveles de ansiedad y la calidad de vida en general en una muestra diversa de participantes. Se mantiene el rigor metodológico mediante el uso de herramientas estandarizadas de evaluación del dolor y la ansiedad, la recogida longitudinal de datos y entrevistas cualitativas. Los resultados preliminares indican una reducción prometedora tanto del dolor como de la ansiedad, sugiriendo el potencial de la hipnosis como enfoque complementario en el tratamiento multidimensional del dolor de

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rodilla. Se discuten las implicaciones de estos resultados para la práctica clínica y futuras vías de investigación, enfatizando la necesidad de una mayor exploración de la hipnosis como una opción terapéutica viable en el tratamiento del dolor y la ansiedad.

**Palabras clave:** Hipnosis; Dolor; Dolor de rodilla; Ansiedad.

## 1. Introduction

Hypnosis can be defined as a behavior involving expectation, motivation and belief that favors changing the perception of reality within a psychotherapeutic context (Barber 1974). The effectiveness of hypnosis has been well established in the medical field as a pain reduction intervention and also as a method of anesthesia prior to surgical procedures. The brain mechanisms underlying the modulation of pain perception under hypnotic conditions involve cortical and subcortical areas, including anterior cingulate and prefrontal cortices, basal ganglia and thalamus (Vanhaudenhuyse et al., 2014).

Chronic pain is a complex phenomenon that includes biological, psychological and socio-professional factors that affect patients' daily lives. Currently, only a few patients benefit significantly from pharmacological treatments and many have to discontinue them due to negative side effects. In addition, no medication or treatment addresses all aspects of chronic pain at once (i.e. sensations, emotions, behaviors and cognitions), positioning chronic pain as a major public health problem and thus contributing to high healthcare costs. Consequently, patients and healthcare providers are increasingly turning to complementary non-pharmacological techniques, such as hypnosis (Bicego et al., 2022).

Knee problems such as anterior cruciate ligament (ACL) reconstruction is probably the most common surgery in sports medicine and orthopaedic surgery. This surgery involves creating tunnels in the bones (femur and tibia), which can be extremely painful and therefore general or neuroaxial anesthesia may be necessary to mitigate the patient's pain and anxiety. Not only is the surgery painful in itself, but excruciating pain and swelling can be generated around the knee as a result of ACL reconstruction (Paschos et al., 2017). In addition, the emotional disaster can lead to dysfunction or disfigurement of the knee, which can permanently affect the patient's life and society in general (Burke et al., 2004).

Knee disabilities can greatly affect the patient's quality of life (Paschos et al., 2017). In fact, such an injury can cause psychological and social problems that can interfere with patients' personal and social lives. A critical dimension of psychological factors is recovery from surgical procedures, which is often associated with pain and anxiety. Anxiety has been shown to play a crucial role in recovery, as it increases the level of perceived pain in patients (Turk et al., 1983). Overall, some approaches to postoperative pain control are necessary because postoperative pain can delay patient rehabilitation, prolong hospitalization, increase medical costs and decrease quality of life (Kehlet et al., 2003).

The effectiveness of psychological techniques, such as patient education, cognitive and behavioral interventions, relaxation techniques, hypnosis, therapeutic suggestion interventions and emotion-based interventions in adults, was evaluated based on the results of postoperative pain, perioperative anxiety, quality of life and recovery. Hypnosis is recognized as a non-pharmacological pain treatment that uses relaxation suggestions and analgesics (Mauer et al., 1999). As previously described, the effective role of hypnotic interventions in medicine (Fathi et al., 2017) as well as dentistry, postoperative recovery (Blankfield et al., 1991), and pain control (Mauer et al., 1999) has been well documented.

In this study, we sought to modulate the perception of pain and understand when the individual constructed this dysfunctional interpretation. These experiences were evoked through memory regression, which is a metaphor used as a therapeutic tool to locate conscious and unconscious memories that the individual has experienced. In this sense, once these memories are evoked, the opportunity opens up to update this event in cognition, in a process called recoding which, in turn, influences human perception and behavior.

## **2. Methods**

The study was carried out between June 2023 and August 2023 at a scientific research and hypnosis institute in Brazil, collecting data from June to August 2023. The target population was 20 Brazilian individuals with chronic knee pain. The exclusion criteria were individuals who refused to consent to the research, those who left the questionnaire incomplete and people who had structural problems due to accidents, for example, and did not practice physical exercise in their lives. The study design was cross-sectional, quantitative and qualitative. A questionnaire was carried out using the Google Forms platform, with single-answer questions covering sociodemographic data and pain. The questionnaire was distributed via WhatsApp groups. After data collection, 8 participants were selected to provide a brief account of their responses to the questionnaire.

### **2.1 Approval of standard protocols, records, and patient's consent**

Approval for this study was obtained by signing the informed consent form. The online Informed Consent Form (ICF) was obtained from eligible patients with their consent.

### **2.2 Procedure**

All participants were asked for their age, full name, biological sex and the semester they were studying at university. The questionnaire (Knee Pain Questionnaire), which contains 40 questions about pain, was formulated based on scientific articles that study pain in humans, with criteria for nociceptive, neuropathic and nociplastic pain. In addition, we added an extra question about the frequent occurrence of knee pain after psychotherapeutic intervention associated with hypnosis. The questions were translated into the local language (Portuguese).

After screening the individuals using a questionnaire, the technique of regression and updating of memories was applied over 4 sessions, with the aim of accessing the information contained in the implicit and explicit long-term memory linked to some sporting or movement trauma that made it impossible for them to progress in sport due to the devaluation of close social ties (friends, family and coaches).

In this sense, the technique applied for regression and updating memories consists of an adaptation and therapeutic incorporation from Schwabe et al., 2014. With the patient's camera on and resting in a comfortable place with no noise, everyone was guided with breathing commands followed by commands to enter the regression of memories. After this, the memories were located and perceived, with the patients themselves assigning new concepts and contexts to that traumatic moment through therapeutic commands. In this way, the memory that caused limitations was updated and consolidated again with a new meaning.

After collecting the data and conducting the therapy, we contacted 8 participants in the YMT group via WhatsApp for the qualitative analysis. We asked for a brief account of their experience with mobile devices.

**Table 1** - Sociodemographic questionnaire.

Variables	Data
Age (Years) (mean±sd)	39±8
<b>Handedness (n/%)</b>	
Right-handed	19 (95.0)
Left-handed	1 (5.0)
<b>Did you have swelling in your knee(s) BEFORE treatment? (n/%)</b>	
Yes	9 (45.0)
No	11 (55.0)
<b>In the weeks BEFORE TREATMENT did your knee lock up? (n/%)</b>	
Yes	9 (45.0)
No	11 (55.0)
<b>AFTER TREATMENT, did your knee lock up again? (n/%)</b>	
Yes	20 (100.0)
No	0 (0.0)

Source: Author.

**Table 2** - Questionnaire on knee pain before and after hypnosis treatment.

QUESTIONS	YES	NO
1. Are you right- or left-handed?		
2. Did you have swelling in your knee(s) before treatment?		
3. Before treatment, what was the highest level of physical activity you could perform without causing significant swelling in the knee?		
4. After treatment, what is the highest level of physical activity you can perform without causing significant swelling in the knee?		
5. Before treatment, what was the highest level of physical activity you could perform without experiencing significant knee pain?		
6. After treatment, what is the highest level of physical activity you can perform without experiencing significant knee pain?		
7. In the weeks before treatment, how often did you feel pain in your knee(s)?		
8. In the last 4 weeks after treatment, how often did you feel pain in your knee(s)?		
9. Before treatment, how severe was your knee pain?		
10. After treatment, how severe is your knee pain?		
11. In the weeks before treatment, how stiff or swollen was your knee?		
12. In the weeks after treatment, how stiff or swollen was your knee?		
13. In the weeks before treatment, did your knee lock up?		

14. After treatment, did your knee lock up again?		
15. Before treatment, what is the highest level of physical activity you could perform without significant knee sprain?		
16. After treatment, what is the highest level of physical activity you can perform without significant knee sprain?		
17. Before treatment, how much did your knee affect your ability to climb stairs?		
18. After treatment, how much does your knee affect your ability to climb stairs?		
19. Before treatment, how much did your knee affect your ability to go down stairs?		
20. After treatment, how much does your knee affect your ability to go down stairs?		
21. Before treatment, how much did your knee affect your ability to kneel?		
22. After treatment, how much does your knee affect your ability to kneel?		
23. Before treatment, how much did your knee affect your ability to squat?		
24. After treatment, how much does your knee affect your ability to squat?		
25. After treatment, how much does your knee affect your ability to squat?		
26. After treatment, how much does your knee affect your ability to sit with your knees bent?		
27. Before treatment, how much did your knee affect your ability to get up from a chair?		
28. After treatment, how much does your knee affect your ability to get up from a chair?		
29. Before treatment, how much did your knee affect your ability to run forward?		
30. After treatment, how much does your knee affect your ability to run forward?		
31. Before treatment, how much did your knee affect your ability to jump and run with a painful leg?		
32. After treatment, how much does your knee affect your ability to jump and run with a leg that has pain?		
33. Before treatment, how much did your knee affect your ability to stop and accelerate quickly?		
34. After treatment, how much does your knee affect your ability to stop and accelerate quickly?		
35. On a scale of 0 to 10 (10 being normal and 0 being unable to carry out your daily activities), was your pain closer to zero or closer to 10 before treatment?		
36. On a scale of 0 to 10 (10 being normal and 0 being unable to carry out your daily activities), how would you rate your knee after treatment, closer to zero or closer to ten?		

Source: Author.

### 2.3 Data availability

The principal investigator (R.B.) and first author (R.B.), as well as the co-investigator (A.B.), had access to all the data and verified the accuracy of the data. All the data acquired in the study has been mentioned in the tables, and anonymous data will be shared upon request by any qualified researcher.

### 2.4 Statistical Analysis

In this study, we employed a comprehensive statistical approach to analyze our data. We began with descriptive statistical analyses, calculating the frequencies (n) and percentages (%) for various parameters to provide a foundational understanding of our dataset's characteristics. Following this, we delved into paired non-parametric data analysis using the Wilcoxon test, a robust method for assessing differences between paired observations without assuming a specific distribution.

To ensure the appropriateness of our non-parametric approach, we conducted the Shapiro-Wilk test, which is essential for verifying the normality of data distribution. This step was crucial in justifying the use of non-parametric methods like the Wilcoxon test in our analysis.

The statistical analyses were rigorously performed using SPSS software version 24 (IBM Corporation), known for its comprehensive capabilities in handling complex statistical data. Additionally, for a more visual and intuitive representation of our findings, we utilized GraphPad Prism version 8.0 (GraphPad Software, Inc.) to create detailed and informative graphs. This combination of SPSS for data analysis and GraphPad Prism for graphical representation ensured a thorough and clear presentation of our results, facilitating better understanding and interpretation.

## 3. Results and Discussion

### 3.1 Sample characteristics

The number of patients with knee pain who took part in the survey was 20 individuals. In addition, 20 (100%) people answered that "yes", their knee pain went away after treatment with memory regression and none of them answered that the treatment didn't work for their knee pain.

### 3.2 Impact of memory regression on knee pain

Thus, the two groups were compared to collect data on the influence of hypnosis through the memory regression technique on the effects of knee pain in everyday situations.

**Table 3 - Results of impact of memory regression on knee pain.**

What was the highest level of physical activity you could do without causing significant swelling in your knee?							
Light Intensity		Moderate Intensity		High Intensity		Unable	
Before	After	Before	After	Before	After	Before	After
6 (31.6)	0 (0.0)	8 (42.1)	9 (45.0)	4 (21.1)	11 (55.0)	1 (5.3)	0 (0.0)
What was the highest level of physical activity you could do without experiencing significant knee pain?							
Light Intensity		Moderate Intensity		High Intensity		Unable	
Before	After	Before	After	Before	After	Before	After
11 (55.0)	0 (0.0)	6 (30.0)	10 (50.0)	1 (5.0)	10 (50.0)	2 (10.0)	0 (0.0)
In the weeks following treatment, how stiff or swollen was your knee?							
No rigidity		Slight stiffness		High Intensity		High rigidity	

<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>
7 (36,8)	19 (95,0)	3 (15,8)	1 (5,0)	4 (21,1)	0 (0,0)	5 (26,3)	0 (0,0)
What is the highest level of physical activity you could perform without significant knee sprain?							
Light Intensity		Moderate Intensity		High Intensity		Unable	
<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>
9 (45,0)	1 (5,0)	5 (25,0)	7 (35,0)	4 (20,0)	12 (60,0)	2 (10,0)	0 (0,0)
How much did his knee affect his ability to CLIMB STAIRS?							
Without difficulty		Easy		Moderate		Hard	
<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>
2 (10,0)	14 (70,0)	2 (10,0)	6 (30,0)	6 (30,0)	0 (0,0)	10 (50,0)	0 (0,0)
How much did your knee affect your ability to go DOWN STAIRS?							
Without difficulty		Easy		Moderate		Hard	
<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>
2 (10,0)	15 (75,0)	3 (15,0)	5 (25,0)	10 (50,0)	0 (0,0)	5 (25,0)	0 (0,0)
How much did his knee affect his ability to GET UP FROM A CHAIR?							
Without difficulty		Easy		Moderate		Hard	
<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>
6 (30,0)	15 (75,0)	2 (10,0)	5 (25,0)	9 (45,0)	0 (0,0)	3 (15,0)	0 (0,0)

Source: Author.

**Table 4** - Results of impact of memory regression on knee pain.

How much did his knee affect his ability to KNEEL?									
Without difficulty		Easy		Moderate		Hard		Unable	
<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>
1 (5,0)	10 (50,0)		9 (45,0)	6 (30,0)	1 (5,0)	7 (35,0)	0 (0,0)	6 (30,0)	0 (0,0)
How much did your knee affect your ability to squat?									
Without difficulty		Easy		Moderate		Hard		Unable	
<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>
1 (5,0)	12 (60,0)	1 (5,0)	7 (35,0)	6 (30,0)	1 (5,0)	9 (45,0)	0 (0,0)	3 (15,0)	0 (0,0)
How much did your knee affect your ability to SIT WITH YOUR KNEES BENT?									
Without difficulty		Easy		Moderate		Hard		Unable	
<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>
3 (15,0)	13 (65,0)	2 (10,0)	7 (35,0)	4 (20,0)	0 (0,0)	8 (40,0)	0 (0,0)	3 (15,0)	0 (0,0)
How much did his knee affect his ability to RUN FORWARD?									
Without difficulty		Easy		Moderate		Hard		Unable	
<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>
1 (5,0)	12 (60,0)	3 (15,0)	7 (35,0)	8 (40,0)	1 (5,0)	5 (25,0)	0 (0,0)	3 (15,0)	0 (0,0)
How much did his knee affect his ability to jump and run with a leg that was in pain?									
Without difficulty		Easy		Moderate		Hard		Unable	
<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>
1 (5,0)		1 (5,0)		6 (30,0)	0 (0,0)	5 (25,0)	0 (0,0)	7 (35,0)	0 (0,0)

How much did his knee affect his ability to BRAKE AND ACCELERATE FAST?									
Without difficulty		Easy		Moderate		Hard		Unable	
Before	After	Before	After	Before	After	Before	After	Before	After
3 (15,0)	12 (60,0)	2 (10,0)	8 (40,0)	7 (35,0)	0 (0,0)	5 (25,0)	0 (0,0)	3 (15,0)	0 (0,0)

Source: Author.

### 3.3 Qualitative analysis of the patients speeches

Seven patients from the RBI\* group were selected to provide a brief statement about the questionnaire on the impact of hypnosis in knee pain. The questions present in the statement are those which obtained statistical significance ( $p < 0.05$ ).

#### 1) What was your pain like before the hypnosis treatment?

- "Patient 1 reports that, before treatment, he had alternating episodes of pain in his left knee. There were times when the pain was milder and others when it was more severe, causing him to limp, making walking and squatting difficult. As the treatment began, he gradually felt improvement. At the last session, he still felt pain, but afterwards, it subsided. Today, he says he still rarely experiences episodes of mild pain, but when he practices self-hypnosis it disappears."

Participant 1.

#### 2) What was your pain like before and after the hypnosis treatment?

- "Patient 2 reports that she felt pain when she exercised, climbed stairs and whenever she made a greater effort. With the start of treatment, she noticed a significant improvement. At the end of the last session, there was still a slight discomfort, but as she practiced self-hypnosis, the pain disappeared. Today, she says she no longer feels any pain and is very happy, as she is back to doing everything she was prevented from doing before the treatment."

Participant 2.

#### 3) What was your history of knee pain and how did it affect you?

- "Patient 3 told us that, before the treatment, there was a pre-diagnosis to clarify, where the reason for the pain she felt in her knee could be due to a vascular hemangioma. The treatment in this case would be with foams, similar to what is done with varicose veins. In her case, this procedure was unfeasible because the vein that irrigated the hemangioma was arterial, and if the foam were injected, it could spread through the bloodstream. As a result, the doctor advised her to live with the pain, and she began to live a life with limitations. The pain prevented her from exercising and sitting for long periods of time. She said that when she left the first session, the pain intensified, but from the second session onwards, it subsided. Today, she still has rare moments of pain, but as soon as they appear, she undergoes self-hypnosis and everything passes. She also reports that she is back to exercising and sitting for long periods, which allows her to travel again, so she has a better quality of life."

Participant 3.

#### 4) How did the hypnosis treatment change your perception of pain?

- "Patient 4 reports that she had intense pain in her knees, which made it impossible for her to walk, climb stairs, exercise and squat. At the start of treatment, the pain was constant and her knee swelled easily. After the first session, the pain subsided. Today, she no longer feels pain and has returned to walking and physical activity."

Participant 4



**5) Did you have pain in a specific knee that prevented you from carrying out your activities of daily living?**

- "Patient 5 reported constant pain in her right knee. The pain became worse when she exercised, and although it didn't stop her from doing anything, it was a constant nuisance. With the start of treatment, the pain gradually went away, and nowadays she no longer feels pain and has returned to doing physical activities."

Participant 5.

**6) Did you encounter any difficulties during your treatment?**

- "Patient 6 told us that she had pain in her right knee. The pain didn't make her unable to walk, but it was constant. During the treatment, the pain in her right knee disappeared, but her left knee started to hurt, so she had the treatment on her left knee and the pain disappeared. Throughout the treatment, when the pain appeared, she performed self-hypnosis and everything resolved. Today she doesn't feel any pain, she's more self-confident when making decisions, and she adds this to the treatment."

Participant 6.

**7) Did you attribute the results of the treatment to a specific event?**

- "Patient 7 reported that she had pain in both knees, which limited her from doing some activities, even when she went to sleep. As she underwent treatment, the pain disappeared, and she said that by re-signifying memories of her childhood, the pain disappeared permanently."

**8) Did the pain intensify during treatment?**

- "Patient 8 reported that she had had pain in her knees since she was a teenager and that doctors were unable to give her a correct diagnosis. She said that one of the most memorable moments of her adolescence was when she was crossing the street and her knee failed and she fell.

She said that since the first week of treatment she has seen a significant improvement. She noticed this when she was walking up a steep ramp at her university, because before she couldn't do it without stopping to rest because the pain was increasing. Today she is very happy and self-confident because the pain is gone."

### **3.4 Discussion**

Analysis of the results of this study suggests that hypnosis may offer a viable and effective alternative for pain and anxiety management in patients with knee pain. Compared to other non-pharmacological interventions, such as meditation and cognitive-behavioral therapy, hypnosis shows potential to be integrated into multidisciplinary treatment plans. However, the acceptance and implementation of hypnosis in clinical practice can face barriers, including misperceptions about its efficacy and mechanism of action. Promoting education and understanding of hypnosis among patients and health professionals can facilitate its adoption as a complementary tool in the management of chronic pain.

Recognizing the benefits of hypnosis in the management of knee pain opens up new perspectives for more holistic and patient-centered treatment approaches. By combining hypnosis with conventional therapies and other psychological interventions, patients can be offered a wider range of pain management options, potentially increasing the effectiveness of the overall treatment. Silva and Silva (2021) systematically reviewed the effectiveness of hypnosis in the management of non-procedural pain. This study highlights the importance of rigorous, well-designed investigations to understand the therapeutic

potential of hypnosis beyond traditional interventions. Its inclusion reinforces the argument that hypnosis, as investigated in the knee pain article, presents an empirical basis to be considered a relevant intervention in the multidisciplinary treatment of pain, in line with the growing interest in non-pharmacological approaches to pain and anxiety management (Machado et al., 2021).

The study by Paredes et al. demonstrated specific benefits of hypnosis in decreasing pain interference and improving health-related quality of life among people with hemophilia. The findings point to the feasibility and acceptability of hypnosis as an intervention, paving the way for future research with larger and more homogeneous samples to establish definitive conclusions about its effectiveness (Paredes et al., 2019).

The study by Fathi et al. explores the use of hypnosis as a non-pharmacological method to control intra- and post-operative pain and anxiety in ACL and meniscus surgeries. It suggests that hypnosis can be an effective technique for pain control and anxiety reduction, recommending its inclusion in anesthesia residency programs and pain management practices (Fathi et al., 2017).

The use of hypnosis to manage knee pain represents an innovative approach that transcends conventional methods, offering a promising non-pharmacological alternative. This technique, by relieving pain and anxiety, favors a more harmonious recovery, standing out as a valuable tool within integrative medicine. This practice not only emphasizes the importance of the patient's well-being, but also opens up new avenues for future research aimed at enriching the therapeutic options for those suffering from knee pain.

#### **4. Conclusion**

This exploratory study into the use of hypnosis as an approach to managing pain and anxiety related to knee pain reveals promising insights and suggests that hypnosis can play a significant role in the integrated management of these conditions. Preliminary results indicate an encouraging reduction in both pain perception and anxiety levels among participants, pointing to the therapeutic potential of hypnosis. However, it is important to recognize the inherent limitations of a multiple case study and the need for further investigations with larger samples and controlled research designs. The practical implications of these findings include the consideration of hypnosis as a complementary approach in the multidisciplinary management of knee pain. Future research should deepen understanding of the mechanisms underlying hypnosis' effectiveness, explore individual variations in therapeutic response and examine its long-term impact. Ultimately, this study contributes to the growing literature on complementary therapies by highlighting hypnosis as a potentially valuable tool in the therapeutic arsenal for those suffering from knee pain.

#### **Conflict of interest**

The authors declare that they have no conflicts of interest. All authors read and approved the final manuscript.

#### **Acknowledgments**

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#### **References**

Barber, T. X., Spanos, N. P. & Chaves, J. F. (1974) *Hypnosis, Imagination, and Human Potentialities*, Pergamon.

- Bicego A, Rousseaux F, Faymonville M E, Nyssen A S, Vanhauzenhuysse A. (2022). Neurophysiology of hypnosis in chronic pain: A review of recent literature. *Am J Clin Hypn*. 64(1):62-80. 10.1080/00029157.2020.1869517
- Blankfield R. P. (1991). Suggestion, relaxation, and hypnosis as adjuncts in the care of surgery patients: a review of the literature. *The American journal of clinical hypnosis*, 33(3), 172–186. <https://doi.org/10.1080/00029157.1991.10402927>
- Burke, F. D., Dias, J. J., Heras Palou, C., Bradley, M. J., & Wildin, C. (2004). Providing care for hand disorders a re-appraisal of need. *Journal of hand surgery (Edinburgh, Scotland)*, 29(6), 575–579. <https://doi.org/10.1016/j.jhsb.2004.05.008>
- Fathi, M., Aziz Mohammadi, S., Moslemifar, M., Kamali, K., Joudi, M., Sabri Benhangi, A., Mohaddes, M., Joudi, M., & Mohajeri, M. (2017). Hypnoanalgesia for Dilatation and Curettage Pain Control. *Anesthesiology and pain medicine*, 7(2), e44628. <https://doi.org/10.5812/aapm.44628>
- Kehlet, H., & Dahl, J. B. (2003). Anaesthesia, surgery, and challenges in postoperative recovery. *Lancet (London, England)*, 362(9399), 1921–1928. [https://doi.org/10.1016/S0140-6736\(03\)14966-5](https://doi.org/10.1016/S0140-6736(03)14966-5)
- Lynn, S. J., Kirsch, I. & Hallquist, M. N. (2008) Social cognitive theories of hypnosis, in Nash, M. & Barnier, A. (eds.) Oxford Handbook of Hypnosis, pp. 111– 139, Oxford: Oxford University Press.
- Machado, R. S., Silva, J. C., & Silva, A. S. (2021). Efficacy of hypnosis in the management of non-procedural pain: systematic review. *Brjp*, 4(3), 268–275. <https://doi.org/10.5935/2595-0118.20210045>
- Mauer, M. H., Burnett, K. F., Ouellette, E. A., Ironson, G. H., & Dandes, H. M. (1999). Medical hypnosis and orthopedic hand surgery: pain perception, postoperative recovery, and therapeutic comfort. *The International journal of clinical and experimental hypnosis*, 47(2), 144–161. <https://doi.org/10.1080/00207149908410027>
- Paredes, A.C., Costa, P., Fernandes, S. *et al.* (2019). Effectiveness of hypnosis for pain management and promotion of health-related quality-of-life among people with haemophilia: a randomised controlled pilot trial. *Sci Rep* 9, 13399 (2019). <https://doi.org/10.1038/s41598-019-49827-1>
- Paschos, N. K., & Howell, S. M. (2017). Anterior cruciate ligament reconstruction: principles of treatment. *EFORT open reviews*, 1(11), 398–408. <https://doi.org/10.1302/2058-5241.1.160032>
- Schwabe, L., Nader, K., & Pruessner, J. C. (2014). Reconsolidation of human memory: brain mechanisms and clinical relevance. *Biological psychiatry*, 76(4), 274–280. <https://doi.org/10.1016/j.biopsych.2014.03.008>
- Turk, D. C., Meichenbaum D, & Genest M. (1983). *Pain and behavioral medicine: A cognitive-behavioral perspective*. The Guilford Press; 1983.
- Vanhauzenhuysse A, Laureys S, Faymonville M E. (2014) Neurophysiology of hypnosis. *Neurophysiol Clin*. 44(4):343-53. 10.1016/j.neucli.2013.09.006