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Telehealth Chronic Pain Management for the Elite Athlete Population: A Multifactorial Approach

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Abstract

Chronic pain (CP) is understood to be one of the leading causes of disability and poor quality of life and, has multidimensional components to its perception by those suffering from it. All individuals who suffer from CP perceive their pain through individualized experiences. However, notably, elite athletes facing CP appear to have significantly different experiences and needs navigating through CP due to their physical requirements within their specific sports. Previously published research has specifically focused on the management of acute pain (AP) in elite athletes and seems to have very little content around athletes with CP. Elite athletes suffering from CP rather than AP have complex demands placed on them such as their professional, recreational and social demands. Therefore, working with athletes with CP needs to incorporate all these facets and more. The following review will firstly focus on interdisciplinary pain management with elite athletes experiencing CP. Secondly, the paper will describe telehealth CP pain management with this population as well as group-based pain management programs (GPMPs). Finally, the therapeutic alliance (TA) and group dynamics (GDs) are described in this review as key variables that predict better pain outcomes for athletes going through telehealth programs

Keywords: Elite Athletes, Chronic Pain, Telemedicine, Therapeutic alliance, Group Programs

Introduction: Chronic Pain in the General Population Versus the Elite Athlete Population

Chronic musculoskeletal pain, a multifaceted experience, has substantial consequences on patients themselves, as well as on their families, relationships, social and professional lives, and ultimately causes a decline in quality of life (QOL) for both the patients and their families [1,2]. The IASP (2020) definition of pain is: "An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage." [3]. The Global Burden of Disease Study in 2016 reiterated that the high prominence of pain and pain-related diseases and disorders is the foremost cause of disability and disease burden globally [4]. As a consequence, the 2016 National Pain Strategy called for greater precision in the estimation of chronic pain (CP) and high-impact CP in order to reliably establish the occurrence of CP and assist in the development and establishment of population-wide pain intervention strategies [5]. National estimates of high-impact CP can help distinguish individuals with restrictions in major life domains including work, social, recreational, and self-care activities from those people whom seem to preserve normal life activities despite their CP experiences [5]. This provides better insight into the population who seem to be in need of pain services [5]. Hunt and Day (2019) state that elite sportsman who experience CP have a different experience to the general population who experience CP [6]. This may be most likely due to the interconnection between their professional (physical and psychological training, pre-habilitation, playing their specific sport and post-game routine), recreational and social demands placed on them. In addition, it is suggested that acute pain (AP) perception as a result of sporting injuries differs greatly from those athletes suffering from the CP experience [6]. Acute injury and/or AP has been the focus in the past and still in the present on the elite sporting population. However, CP has been underrepresented in this group of individuals. Specific statistics around the incidence of CP in professional sports players is still

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not well known. The high training volume in elite athletes, potentially increases the prevalence rates of chronic low back pain, for example, as might less training or exercise ratios do so in the general active or inactive population [7]. Research has also revealed that the relatively uninvestigated factors surrounding psychosocial issues in elite athletes suffering from CP, need further assessment and treatment [8].

Interdisciplinary Chronic Pain Management for the Elite Athlete

Research has suggested that various aspects of an athlete`s identity, such as negative affect, can lead to a heightening of pain-related distress, that has negative consequences on a patient`s rehabilitation back to health and full fitness [9]. Due to the large amount of emphasis placed on sports in today`s world, being a high-performance athlete comes with additional stress and demands to return to their particular sport [9]. The above therefore places enormous amounts of pressure to perform within the parameters of their required high level [9]. In turn, this may lead to pain-related psychological anguish such as anxiety and depression [9]. Therefore, understanding the CP experience in the elite athlete population needs to be dissected through a comprehensive biopsychosocial framework, as with CP in the general population. Targeting assessment and treatment of AP and CP in this sub-group of the global population, should certainly account for all pain manifestations including physiological and/or anatomical mechanisms, psychological and social mechanisms. For example, encouraging athletes in pain to maintain social interactions with their teammates, as part of developing an interdisciplinary treatment plan, may be an extremely necessary task to accomplish social goals as part of the biopsychosocial model of rehabilitation. Understanding patient-driven goals instead of clinician-driven goals, and patient motivations as part of their recovery, should be a critical task in order to achieve potentially getting back to their highest level of performance [9]. Interdisciplinary pain management certainly proves to be a viable format in which all individuals experiencing CP, including professional athletes, may use to engage in full patient-centered management consultations to help manage their pain through a biopsychosocial lens. Interdisciplinary telehealth pain management, has been found not only efficacious in monitoring and adjusting analgesic medication but also for the delivery of non-pharmacological treatments. Non-pharmacologocal treatments may include pain self-management strategies such as Cognitive Behavioral Therapy (CBT), mindfulness based intervention, motivational instructions for exercise based treatment [10-14], goal setting, therapeutic pain neuroscience education, graded activity, graded exposure, pacing and other self-pain management techniques. CBT and new psychological techniques falling under its umbrella, has become the most widely used psychosocial treatments for CP, with evidence of improved pain intensity, pain-related disability and associated problems such as anxiety, depression and insomnia, for example [15-16]. Other psychological modalities born out of CBT used to manage CP, include Dialectical Behavioral Therapy (DBT) and now the widely used treatment of Acceptance Commitment Therapy (ACT). However, research for pure CBT, specifically for athletes, is limited. One previous study did find that CBT intervention reduced athletes` anxiety, pain and days to recovery following arthroscopic surgery for meniscus repair [17]. Therefore, further research still needs to be conducted around CBT techniques for elite sportsmen/sportswoman, in addition to studies investigating DBT, ACT and other psychological treatments. However, it is hypothesized that as with the general population whom suffer from CP conditions, improvement in pain outcomes based on all the above described pain management techniques [2,18-25], these treatment techniques and modalities would most likely be extremely viable for professional sports players also suffering from CP. These pain management techniques encompass a full biopsychosocial framework of management for all patients with CP, thus providing an all-encompassing treatment direction that understands pain through a patient-centered approach. Utilizing pain management techniques, as alluded to above, ultimately aids in patients with CP managing their pain rather than their pain managing them. In addition, these non-pharmacological and non-invasive techniques assists patients with CP in achieving short, medium, and long-term goals, which may incorporate getting back to full fitness to participate competitively in their specific sport.

Telehealth Chronic Pain Management

The question arises around how and when can the elite athlete access interdisciplinary pain management strategies when they are travelling for competitions or events? Telehealth, based on the recent COVID-19 pandemic, has become an important medical and psychological consultation tool to use for the general population, due to the previous COVID-19 social distancing protocols. The growing field of telehealth, defined for the purposes of this paper as "technology that allows for distance interaction between providers and/or patients" (McGeary et al, 2012 p.570), offers a new opportunity to expand upon pain assessment, consultatory work and treatment services beyond the healthcare provider`s consultation rooms [26]. It has continued to be an essential and integral component of healthcare delivery. In addition, telehealth has continued to be an extremely resourceful modality for those individuals who may not have geographical access to medical and psychological care, including pain management appointments. Besides often not having the convenience of an entire healthcare team travelling with elite athletes such as a doctor, trainer, physiotherapist (Physical Therapist), sports psychologist and others, as briefly mentioned above, telehealth may be used as an important add-on to rehabilitation for elite athletes suffering from CP. A systematic review and meta-analysis completed in 2008 that looked at

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research conducted using telehealth with patients presenting with a broad array of diseases, found that some of the main benefits derived from telehealth services (remote patient monitoring- RPM) were reduced hospital utilization, improved compliance to treatment plans, improved patient satisfaction with health-care provided, and improved QOL [27,28]. Therefore, a consultation through "*TelePain*", as referred to by Eaton (2014) et al, with the patients` primary care provider or pain specialist has been shown to be a feasible manner in which to improve patients` QOL and general functioning [29]. Ultimately *TelePain* bridges physical distances through the use of video, web and telephone conferencing technologies to increase access to chronic pain management" (Eaton, 2014, p.22) [29]. This in turn, would aid in bridging the gap for professional sportsman suffering from CP, who are on the road travelling, and would therefore contribute to the ability to consult with a pain management specialist and/or other healthcare providers if necessary. Herbert et al (2017), found that treatment for patients with CP, suggest that in-person ACT, a key psychological treatment mentioned earlier in this review, which is now used to treat patients with CP and aids with self-management of their symptoms, was as efficacious when delivered via video teleconferencing (VTC) [30]. This result should be no different to when treating elite athletes with CP. Overall, research has found high patient satisfaction when using telehealth, independent of technical difficulties. However, further investigation needs to be be completed to pin-point the best methods of telehealth delivery to make use of covert efficacious treatment variables such as the therapeutic alliance (TA) to maximize the clinical benefit and intervention outcomes [31].

The Therapeutic Alliance: A Key Variable in Telehealth Pain Outcomes

A relatively recent PhD study and an extremely newly published article investigating the predictive nature of the TA on pain outcomes through telehealth pain management programs, found an extremely strong relationship between a robust TA and improved pain outcomes using telehealth methods [32,33]. Strong evidence suggests that a strong patient-clinician relationship and positive therapeutic encounter between the patient and clinician leads to further clinical benefits [33,34]. Research has revealed that the most vital therapeutic contextual expectancies related to placebo analgesia are most likely correlated to the therapeutic alliance; the patient-healthcare relationship that should be established and that aims to provide the patient with the most beneficial outcomes [35-38]. Losin et al (2017), continue to suggest based on their research findings, that teaching clinicians ways in which to establish common ground with their patients may be an effective way in which to create greater trust and rapport with the patient, and in turn positively influence the patient`s pain experience [39]. Research has also broadly shown that clinical empathic engagement with the patient, which is core in rapport development with patients, is beneficial to the patient in terms of compliance, positive clinical outcomes and less complications [40-43]. This seems to be of utmost importance within an elite athlete population, where compliance in terms of CP exercise principles would be crucial to recovery and return to hopefully maximum performance. In addition, the health-care provider`s attitudes and behaviors towards the patient and the passion for the suggested mode of treatment, are also viewed as the most important therapeutic contextual expectancy factors related to placebo analgesia [44,45]. A meta-analysis by Birkhauer et al (2017) assessing trust in the healthcare professional and health outcomes, found that patients appeared to report more beneficial health behaviors, minimized symptoms, enhanced QOL and greater satisfaction with clinical intervention when they had higher trust in their health-care professional [46]. Therefore, specifically utilizing the TA clinically within telehealth sessions for athletes with CP should certainly be implemented further within telehealth pain management consultations. Clinicians involved in pain healthcare, who are considering the medium of telehealth as a pain treatment option for elite sports players, are encouraged to critically evaluate how to translate in-person TA and care, equally, into a telehealth format [47].

Group-Based Telehealth Pain Management: Another Key Variable in Telehealth Pain Outcomes for Elite Athletes

Another important covert therapeutic variable that has been proven to be useful in pain management is the idea of `the group` in group-based pain management programs (GPMPs) [33,48-52]. Recent meta-analyses proved the efficacy of GPMPs on various pain outcome measures [47,53]. The significant results around structural group-based factors, entities such as group dynamics (GDs), the group process, the group climate and therapeutic factors in group work may be key influential elements that work towards improvements in pain outcome measurements [33,54], including improvements in health related quality of life (HrQOL) measures. GPMPs may be extremely useful for athletes that specifically partake in sports that include teamwork, however, should not be exclusively limited to these athletes and should also include athletes that are involved in one-on-one competition. Telehealth pain management should include both one-on-one management and telehealth group-based management programs (TGPMP) [52]. TGPMPs should include a number of athletes at the same time being involved in a single telehealth session or a full TGPMP. A full TGMP may be defined as a number of telehealth sessions with the same group of individuals in each session being taught different self-management techniques from session to session. Again, research has found that the GDs within TGPMPs are also significant predictors of improved pain outcomes following these programs [32,33]. To note, of interest to the notion of therapeutic contextual factors within a group-based program, is the idea of group cohesiveness

[54]. Group cohesiveness is described by Frank-Saracini et al (1998, p.9) cited in Phan (2004, p.237) as "emotional closeness among members; members` caring and empathy toward each other; members` positive regard for what others feel, think and do" [54]. Group-cohesiveness is a relevant theme within group-based intervention that may reflect positively upon the outcomes of treatment.

Elite athletes who play in team-sports or those who play one-on-one sports, often require the energy, dynamics and direct conscious and subconscious observations of their fellow team members or opponents, to perform optimally. So to, this psychological process and mentality may be required or set in action if elite sports players with CP were to be incorporated into an interdisciplinary GPMP, for example. Modern learning theories understand learning as a result of changes in behavior that take place as a consequence of regularities in an individual`s environment [55,56]. Therefore, the therapeutic environment including the GDs within a GPMP should be taken into account when examining subjects` potential changes in behavior based on the therapeutic contextual environment. Behavior, in the above description, refers to both observable deliberate and automatic responses or neuronal activity (brain activity) [55,56]. This notion is in keeping with the pivotal work of Albert Bandura, the foremost theorizer and writer around the theory [56]. Bandura defined observational learning as "changes in patterns of behavior that are a consequence of observing the behavior of others" (Goubert, 2011, p.167-168) [56]. Research has demonstrated that the social models of the pain experience have an impact on autonomic and psychophysical measures of sensory processing of painful events [56,57]. Therefore, based on the above, it is clear that observational learning of pain influences both visible expressions of pain as well as the subjective experience of pain [56]. According to Bandura`s model, it is necessary to clinically and through research, comprehend social observational learning according to covert or subconscious experiences that may explain behavioral, perceptual as well as psychosocial changes in pain perception, and therefore alterations in outcome measures following GPMPs. According to the social observational learning theory model, placebo analgesic effects can be learned through observations of other patients having an analgesic response to a particular treatment [58-61]. Treatment may include medication, invasive treatment, manual treatment, exercise, cognitive behavioral treatment, and other psychoeducational treatments for CP as described earlier. Hence, utilizing the group-process in TGPMPs, may certainly be to the advantage of athletes sharing common pain conditions and therefore may be a necessary and useful intervention to start practicing, and in turn facilitate further improvements in pain manifestations in this sub-group of the general population with CP.

Conclusion: Clinical Relevance

Therefore, in conclusion, elite athletes suffering from CP (or acute pain) may be ideal candidates for telehealth care. A large number of pain treatment modalities can be instituted, modified, monitored, and motivated via a telehealth format [62]. It is important to note however, that not all treatment modalities can be provided to elite athletes with CP via telehealth, such as the need for more invasive treatment techniques that are often required in the short-term to get patients through an event, game or match. Nevertheless, utilizing clinically, either one-on-one telehealth pain management sessions or TGPMPs appear to be an important steppingstone moving forward in the management of this population group. Not only has telehealth pain management proven to be efficacious for individuals suffering from CP, but it also breaks down the physical and practical barriers that may face athletes in accessing the much-needed interdisciplinary pain management healthcare model whilst travelling to undertake sporting competition. Furthermore, using TGPMPs for elite athletes, as a preventative modality to reduce the risk of an acute injury or chronicity following an acute injury, would be a specifically useful task in the future. Telehealth pain management may also reduce the financial burden on service providers and the touring athlete/s by mitigating all the costs that come with setting up a physical practice. Finally, it is recommended that future research starts to analyze in greater detail the possible efficacy underlying telehealth pain management for professional athletes so that thorough evidence-based practice is implemented moving forward.

Competing interests

The author declares that he have no competing interests.

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References

1. E. Shipton, "The chronic pain experience- a dynamic complex interaction," *N. Z. Med. J.*, vol. 121, no. 1270, pp. 9–11, 2008.
2. M. Mathews and S. Davin, "Chronic pain rehabilitation," *Neurosurg. Clin. N. Am.*, vol. 25, no. 4, pp. 799–802, 2014, doi: 10.1016/j.nec.2014.07.004.
3. IASP, "IASP Announces Revised Definition of Pain - IASP," *International Association for the Study of Pain*. https://www.iasp-pain.org/PublicationsNews/NewsDetail.aspx?ItemNumber=9218%0Ahttps://journals.lww.com/pain/Abstract/9000/The_revised_International_Association_for_the.98346.aspx%0Ahttps://www.iasp-pain.org/PublicationsNews/NewsDetail.aspx?ItemNumber=10475.
4. S. E. E. Mills, K. P. Nicolson, and B. H. Smith, "Chronic pain: a review of its epidemiology and associated factors in population-based studies," *Br. J. Anaesth.*, vol. 123, no. 2, pp. e273–e283, 2019, doi: 10.1016/j.bja.2019.03.023.
5. J. Dahlamer, J. Lucas, C. Zeleta, and E. Al, "Prevalence of Chronic Pain and High-Impact Chronic Pain Among Adults-United States," 2017. [Online].

Available: https://www.cdc.gov/nchs/data/series/sr_02/sr02_175.pdf.

6. E. R. Hunt and M. C. Day, "Narratives of chronic pain in sport," *J. Clin. Sport Psychol.*, vol. 13, no. 1, pp. 1–16, 2019, doi: 10.1123/jcsp.2017-0003.
7. D. Fett, K. Trompeter, and P. Platen, "Back pain in elite sports: A cross-sectional study on 1114 athletes," *PLoS One*, vol. 12, no. 6, pp. 1–17, 2017, doi: 10.1371/journal.pone.0180130.
8. K. Trompeter, D. Fett, and P. Platen, "Prevalence of Back Pain in Sports: A Systematic Review of the Literature," *Sport. Med.*, vol. 47, no. 6, pp. 1183–1207, 2017, doi: 10.1007/s40279-016-0645-3.
9. C. Hsu, N. Loecher, A. L. Park, and L. E. Simons, "Chronic Pain in Young Athletes: The Impact of Athletic Identity on Pain-related Distress and Functioning," *Clin. J. Pain*, vol. 37, no. 3, pp. 219–225, 2021, doi: 10.1097/AJP.0000000000000917.
10. J. Gardner, S. Backman, J. Barbati, and J. Grummitt, "Evaluating distance education of a mindfulness-based meditation programme for chronic pain management," *J. Telemed. Telecare*, vol. 14, no. 2, pp. 88–92, 2008, doi: 10.1258/1357633053430403.
11. Y. K. Wong, E. Hui, and J. Woo, "A community-based exercise programme for older persons with knee pain using telemedicine," *J. Telemed. Telecare*, vol. 11, no. 6, pp. 310–315, 2005, doi: 10.1258/1357633054893346.
12. D. Williams, D. Kuper, M. Segar, N. Mohan, M. Sheth, and D. Claw, "Internet-Enhanced Management of Fibromyalgia: A Randomized Controlled Trial," *Pain*, vol. 151, no. 3, pp. 694–702, 2010, doi: 10.1038/jid.2014.371.
13. M. Naylor, S. Naud, F. Keefe, and J. Hlezer, "Therapeutic Interactive Voice Response (TIVR) to Reduce Analgesic Medication Use for Chronic Pain Management," *Pain*, vol. 11, no. 12, pp. 1410–1419, 2010, doi: 10.1038/jid.2014.371.
14. D. C. Ang *et al.*, "Research to Encourage Exercise for Fibromyalgia (REEF): Use of Motivational Interviewing Design and Method," *Contemp Clin Trials*, vol. 32, no. 1, pp. 59–68, 2012, doi: 10.1016/j.cct.2010.08.014. Research.
15. D. A. Zideman *et al.*, "Management of Pain in Elite Athletes: Identified Gaps in Knowledge and Future Research Directions," *Clin. J. Sport Med.*, vol. 28, no. 5, pp. 485–489, 2018, doi: 10.1097/JSM.0000000000000618.
16. A. C. d. C. Williams, E. Fisher, L. Hearn, and C. Eccleston, "Psychological therapies for the management of chronic pain (excluding headache) in adults," *Cochrane Database Syst. Rev.*, vol. 2020, no. 8, 2020, doi: 10.1002/14651858.CD007407.pub4.
17. M. J. Ross and R. S. Berger, "Effects of stress inoculation training on athletes' postsurgical pain and rehabilitation after orthopedic injury.," *J. Consult. Clin. Psychol.*, vol. 64, no. 2, pp. 406–410, 1996, doi: 10.1037//0022-006x.64.2.406.
18. R. J. Gatchel, D. D. McGeary, C. A. McGeary, and B. Lippe, "Interdisciplinary chronic pain management," *Am. Psychol.*, vol. 69, no. 2, pp. 119–130, 2014, doi: 10.1037/a0035514.
19. L. Guy, C. McKinstry, and C. Bruce, "Effectiveness of pacing as a learned strategy for people with chronic pain: A systematic review," *Am. J. Occup. Ther.*, vol. 73, no. 3, 2019, doi: 10.5014/ajot.2019.028555.
20. L. Mccracken, "ACT for Chronic Pain," *Soc. Clin. Psychol.*, no. June, 2015, [Online]. Available: https://www.div12.org/wp-content/uploads/2015/06/ACT-for-Chronic-Pain-manual-McCracken.pdf.
21. E. Lindal and H. Breivik, "Dialectical behavioural therapy for complex chronic pain conditions," *Scand. J. Pain*, vol. 1, no. 1, p. 9, 2010, doi: 10.1016/j.sjpain.2009.09.010.
22. A. Louw, K. Zimney, E. J. Puentedura, and I. Diener, "The efficacy of pain neuroscience education on musculoskeletal pain: A systematic review of the literature," *Physiother. Theory Pract.*, vol. 32, no. 5, pp. 332–355, 2016, doi: 10.1080/09593985.2016.1194646.
23. M. J. Romm, S. Ahn, I. Fiebert, and L. P. Cahalin, "A Meta-Analysis of Therapeutic Pain Neuroscience Education, Using Dosage and Treatment Format as Moderator Variables," *Pain Pract.*, vol. 21, no. 3, pp. 366–380, 2021, doi: 10.1111/papr.12962.
24. M. A. Galán-Martín, F. Montero-Cuadrado, E. Lluch-Girbes, M. C. Coca-López, A. Mayo-Iscar, and A. Cuesta-Vargas, "Pain neuroscience education and physical exercise for patients with chronic spinal pain in primary healthcare: A randomised trial protocol," *BMC Musculoskelet. Disord.*, vol. 20, no. 1, pp. 1–11, 2019, doi: 10.1186/s12891-019-2889-1.
25. J. Lin *et al.*, "Acceptance and commitment therapy for chronic pain: Protocol of a systematic review and individual participant data meta-Analysis," *Syst. Rev.*, vol. 8, no. 1, pp. 1–10, 2019, doi: 10.1186/s13643-019-1044-2.
26. D. D. Mcgeary, C. A. Mcgeary, and R. J. Gatchel, "A Comprehensive Review of Telehealth for Pain Management: Where We Are and The Way Ahead," *Pain Pract.*, vol. 12, no. 7, pp. 570–577, 2012, doi: 10.1111/j.1533-2500.2012.00534.x.
27. S. V. Rojas and M. P. Gagnon, "A systematic review of the key indicators for assessing telehomecare cost-effectiveness," *Telemed. e-Health*, vol. 14, no. 9, pp. 896–904, 2008, doi: 10.1089/tmj.2008.0009.
28. B. Dinesen *et al.*, "Personalized telehealth in the future: A global research agenda," *J. Med. Internet Res.*, vol. 18, no. 3, 2016, doi: 10.2196/jmir.5257.
29. L. Eaton *et al.*, "Development and Implementation of a Telehealth-Enhanced Intervention for Pain and Symptom Management," *Contemp Clin Trials*, vol. 38, no. 2, pp. 213–220, 2014, doi: 10.1038/jid.2014.371.
30. M. S. Herbert *et al.*, "Telehealth Versus In-Person Acceptance and Commitment Therapy for Chronic Pain: A Randomized Noninferiority Trial," *J. Pain*, vol. 18, no. 2, pp. 200–211, 2017, doi: 10.1016/j.jpain.2016.10.014.
31. M. T. Gentry, M. I. Lapid, M. M. Clark, and T. A. Rummans, "Evidence for telehealth group-based treatment: A systematic review," *J. Telemed. Telecare*, vol. 25, no. 6, pp. 327–342, 2019, doi: 10.1177/1357633X18775855.
32. M. J. Romm, "Telehealth Group-Based Pain Mangement Programs: A Prospective Cohort Prognostic Study Investigating Therapeutic Contextual Factors and Other Potential Predictor Variables that Impact on Pain Outcome Measures.," University of Miami: Miller School of Medicine, 2021.
33. M. J. Romm, I. Fiebert, K. Roach, MD Bishop, and L.P. Cahalin. "Telehealth Group-Based Pain Management Programs Using the Therpeutic Alliance and Group Dynamics as Key Predictor Variables," Digital medicine and Healthcare Technology, vol. 2, pp1-29, 2023, doi: 10.5772/DMHT.15.
34. G. Rossettini, E. Carlino, and M. Testa, "Clinical relevance of contextual factors as triggers of placebo and nocebo effects in musculoskeletal pain," *BMC Musculoskelet. Disord.*, vol. 19, no. 1, pp. 1–15, 2018, doi: 10.1186/s12891-018-1943-8.
35. K. Jensen and J. M. Kelley, "The therapeutic relationship in psychological and physical treatments, and their placebo controls.," *Psychol. Conscious. Theory, Res. Pract.*, vol. 3, no. 2, pp. 132–145, 2016, doi: 10.1037/cns0000057.
36. T. D. Wager and L. Y. Atlas, "The neuroscience of placebo effects: connecting context, learning and health," vol. 16, no. 7, pp. 403–418, 2018, doi: 10.1038/nrn3976.The.
37. I. Skyt and L. Vase, "Placebo effects in chronic pain conditions . Can placebo components enhance the efficacy of active treatments ?," *Tidsskr. Forsk. i Sygd. og Samf.*, vol. 23, pp. 63–88, 2015.
38. M. J. Romm, "The Importance of Harnessing Neurophysiological Placebo Analgesic Mechanisms Through Therapeutic Contextual Factors When Treating Patients with Chronic Pain," vol. 8, no. 1, pp. 20–25, 2023.
39. E. A. R. Losin, S. R. Anderson, and T. D. Wager, "Feelings of Clinician-Patient Similarity and Trust Influence Pain: Evidence From Simulated Clinical Interactions," *J. Pain*, vol. 18, no. 7, pp. 787–799, 2017, doi: 10.1016/j.jpain.2017.02.428.
40. B. D. Jani, D. N. Blane, and S. W. Mercer, "The role of empathy in therapy and the physician-patient relationship," *Forsch. Komplementarmed.*, vol. 19, no. 5, pp. 252–257, 2012, doi: 10.1159/000342998.
41. S. Del Canale *et al.*, "The relationship between physician empathy and disease complications: An empirical study of primary care physicians and their diabetic patients in Parma, Italy," *Acad. Med.*, vol. 87, no. 9, pp. 1243–1249, 2012, doi: 10.1097/ACM.0b013e3182628fbf.
42. M. Hojat, J. DeSantis, and J. S. Gonnella, "Patient Perceptions of Clinician's Empathy," *J. Patient Exp.*, vol. 4, no. 2, pp. 78–83, 2017, doi: 10.1177/2374373517699273.
43. M. Hojat, D. Z. Louis, F. W. Markham, R. Wender, C. Rabinowitz, and J.

S. Gonnella, "Physicians' empathy and clinical outcomes for diabetic patients," *Acad. Med.*, vol. 86, no. 3, pp. 359–364, 2011, doi: 10.1097/ACM.0b013e3182086fe1.

44. E. B. Koshi and C. A. Short, "Placebo theory and its implications for research and clinical practice: A review of the recent literature," *Pain Pract.*, vol. 7, no. 1, pp. 4–20, 2007, doi: 10.1111/j.1533-2500.2007.00104.x.
45. S. L. Gryll and M. Katahn, "Psychopharmacology Situational Factors Contributing to the Placebo Effect *," *Psychpharmacology*, vol. 261, pp. 253–261, 1978.
46. J. Birkhäuer *et al.*, "Trust in the health care professional and health outcome: A meta-analysis," *PLoS One*, vol. 12, no. 2, 2017, doi: 10.1371/journal.pone.0170988.
47. D. D. Mcgeary, C. A. Mcgeary, and R. J. Gatchel, "A Comprehensive Review of Telehealth for Pain Management: Where We Are and The Way Ahead," *Pain Pract.*, vol. 12, no. 7, pp. 570–577, 2012, doi: 10.1111/j.1533-2500.2012.00534.x.
48. M. J. Romm, S. Ahn, I. Fiebert, and L. P. Cahalin, "A Meta-Analysis of Group-Based Pain Management Programs: Overall Effect on Quality of Life and Other Chronic Pain Outcome Measures, with an Exploration into Moderator Variables that Influence the Efficacy of Such Interventions," *Pain Med.*, vol. 22, no. 2, pp. 407–429, 2020, doi: 10.1093/pm/pnaa376.
49. T. R. Newton-John and J. Geddes, "The non-specific effects of group-based cognitive-behavioural treatment of chronic pain," *Chronic Illn.*, vol. 4, no. 3, pp. 199–208, 2008, doi: 10.1177/1742395308091868.
50. M. Mehlsen, L. Hegaard, E. Ørnbøl, J. Søndergaard, P. Fink, and L. Frostholm, "The effect of lay-led, group-based self-management program for patients with chronic pain : a randomized controlled trial of the Danish version of the Chronic Pain Self-Management Programme," *Pain*, vol. 158, no. 8, pp. 1437–1445, 2017.
51. E. Toomey, L. Currie-Murphy, J. Matthews, and D. A. Hurley, "The effectiveness of physiotherapist-delivered group education and exercise interventions to promote self-management for people with osteoarthritis and chronic low back pain: A rapid review Part I," *Man. Ther.*, vol. 20, no. 2, pp. 265–286, 2015, doi: 10.1016/j.math.2014.10.013.
52. L. M. Wallace, D. Falla, A. Rushton, and N. R. Heneghan, "Group and individual telehealth for chronic musculoskeletal pain: A scoping review," *Musculoskeletal Care*, vol. 20, no. 2, pp. 245–258, 2022, doi: 10.1002/msc.1594.
53. M. J. Romm, S. Ahn, I. Fiebert, and L. P. Cahalin, "A Meta-Analysis of Therapeutic Pain Neuroscience Education, Using Dosage and Treatment Format as Moderator Variables," *Pain Pract.*, vol. 21, no. 3, pp. 366–380, 2021, doi: 10.1111/papr.12962.
54. L. Phan, E. Rivera, M. Volker, and M. Garrett, "Measuring Group Dynamics: An Exploratory Trial.," *Can. J. Couns.*, vol. 38, no. 4, pp. 234–245, 2004.
55. J. De Houwer, "The propositional approach to associative learning as an alternative for association formation models," *Learn. Behav.*, vol. 37, no. 1, pp. 1–20, 2009, doi: 10.3758/LB.37.1.1.
56. L. Goubert, J. W. S. Vlaeyen, G. Crombez, and K. D. Craig, "Learning about pain from others: An observational learning account," *J. Pain*, vol. 12, no. 2, pp. 167–174, 2011, doi: 10.1016/j.jpain.2010.10.001.
57. K. D. Craig and K. M. Prkachin, "Social modeling influences on sensory decision theory and psychophysiological indexes of pain," *J. Pers. Soc. Psychol.*, vol. 36, no. 8, pp. 805–815, 1978, doi: 10.1037//0022-3514.36.8.805.
58. R. Klinger, J. Stuhlreyer, M. Schwartz, J. Schmitz, and L. Colloca, "Clinical Use of Placebo Effects in Patients With Pain Disorders," *International Review of Neurobiology*, vol. 139. pp. 107–128, 2018, doi: 10.1016/bs.irn.2018.07.015.
59. U. Bingel, L. Colloca, and L. Vase, "Mechanisms and Clinical Implications of the Placebo Effect : Is There a Potential for the Elderly ? A Mini-Review," *Gerentology*, vol. 57, pp. 354–363, 2011, doi: 10.1159/000322090.
60. L. A. Schenk, S. R. Krimmel, and L. Colloca, "Observe to get pain relief: Current evidence and potential mechanisms of socially learned pain modulation," *Pain*, vol. 158, no. 11, pp. 2077–2081, 2017, doi: 10.1097/j.pain.0000000000000943.
61. E. A. Bajcar and P. Babel, "How does observational learning produce placebo effects? A model integrating research findings," *Front. Psychol.*, vol. 9, no. OCT, pp. 1–8, 2018, doi: 10.3389/fpsyg.2018.02041.
62. K. Kroenke, "Calling All Pain Patients: Telehealth Has Arrived," *Pain Pract.*, vol. 12, no. 7, pp. 502–505, 2012, doi: 10.1111/j.1533-2500.2012.00588.x.

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