

The Art of Analgesia: A Pilot Study of Art Museum Tours to Decrease Pain and Social Disconnection Among Individuals with Chronic Pain

Ian J. Koebner, PhD,* Scott M. Fishman, MD,* Debora Paterniti, PhD,[†] Doris Sommer, PhD,[‡] Claudia M. Witt, MD, MBA,^{§,¶,||} Deborah Ward, RN, FAAN, PhD,^{|||} and Jill G. Joseph, PhD, MD^{|||}

*Department of Anesthesiology and Pain Medicine, School of Medicine, University of California, Davis, Sacramento, California; [†]Department of Sociology, Sonoma State University, Sonoma, California; [‡]Department of Romance Languages and Literatures, Harvard University, Cambridge, Massachusetts, USA; [§]Institute for Complementary and Integrative Medicine, University Hospital Zurich and University of Zurich, Zurich, Switzerland; [¶]Institute for Social Medicine, Epidemiology and Health Economics, Charité - University Medical Center, Berlin, Germany; ^{||}University of Maryland School of Medicine, Center for Integrative Medicine, Baltimore, Maryland; ^{|||}Betty Irene Moore School of Nursing, University of California, Davis, Sacramento, California, USA

Correspondence to: Ian J. Koebner, PhD, Lawrence J. Ellison Ambulatory Care Center, 4860 Y St., Suite 3020, Sacramento, CA 95817, USA. Tel: 916-734-7246; Fax: 916-734-2011; E-mail: ikoebner@ucdavis.edu.

Funding sources: This activity was supported in part by the California Arts Council, a state agency (www.arts.ca.gov). Any findings, opinions, or conclusions contained herein are not necessarily those of the California Arts Council. The California Arts Council had no role in the design or conduct of the study; the collection, management, analysis, or interpretation of the data; or the preparation, review, or approval of the manuscript.

Conflicts of interest: Drs. Koebner, Fishman, Paterniti, Witt, Sommer, Ward, and Joseph have no potential conflicts of interest to report.

Abstract

Objective. This mixed-methods study examines the feasibility of art museum tours (Art Rx) as an intervention for individuals with chronic pain. **Methods.** Art Rx provided 1-hour docent-led tours in an art museum to individuals with chronic pain. Survey data were collected pre-tour, immediately post-tour, and at three weeks post-tour. Pain intensity and unpleasantness were measured with a 0–10 numerical rating scale. Social disconnection was measured with a 12-item social disconnection scale. Participants also reported percent pain relief during the tour and program satisfaction in the post-tour survey. Change in pain and social disconnection was analyzed with paired *t* tests, bias-corrected and accelerated bootstrap confidence intervals (BCa CIs), and Cohen's *d*. Thematic analysis of semi-structured interviews with participants explored the feasibility and perceived impact of the program. **Results.** Fifty-four individuals participated in this study (mean age [SD] = 59 [14.5] years, 64.8% female), and 14 were interviewed. Fifty-seven percent of participants reported pain relief during the tour, with an average pain relief (SD) of 47% (34.61%). Participants reported decreased social disconnection and pain unpleasantness pre- to post-tour (3.65, BCa 95% CI = 1.70–5.73, $P < 0.001$, $d = 0.37$; and 0.49, BCa 95% CI = 0.06–0.90, $P = 0.016$, $d = 0.20$, respectively). Participants indicated high satisfaction with the program. Interviewees remarked on the isolating impact of chronic pain and how negative experiences with the health care system often compounded this sense of isolation. Participants experienced Art Rx as a positive and inclusive experience, with potential lasting benefit. **Conclusions.** Art museum tours for individuals with chronic pain are feasible, and participants reported positive effects on perceived social disconnection and pain.

Key words: Pain; Analgesia; Social Context; Art; Museum; Public Health

Introduction

Although chronic pain is widely acknowledged as a complex biopsychosocial phenomenon, socially based

interventions for chronic pain are uncommon [1–5]. The social dimension of pain can be understood as the dynamic interplay between the social environment and the

individual in whom pain is experienced [5]. This interplay can influence whether an individual is exposed to pain, thoughts and feelings when in pain, how pain is communicated, and the response by others to the person in pain [5–7]. Furthermore, social connection, defined as the subjective awareness of being in close relationship with the social world (e.g., friends, peers, society) and reflecting an internal sense of belonging [8], can be analgesic [9–11].

In one study exploring the analgesic effect of social connection, female participants in long-term romantic relationships received a series of controlled painful heat stimuli in several different social contexts—holding their partner’s hand (social connection), a stranger’s hand or a squeeze ball (control conditions), or looking at pictures of their partner (social connection) vs pictures of a stranger or an object (control conditions). Participants reported significantly lower pain ratings in the social connection conditions [9]. These findings of decreased pain ratings in response to viewing pictures of a partner have been replicated in other functional magnetic resonance imaging (fMRI) studies [10,11], which also demonstrated a significant reduction in the dorsal anterior cingulate cortex (dACC) and/or anterior insula (AI) among participants viewing pictures of their partners (vs control images) [10,11], two areas of the brain associated with the affective dimension of pain [12–16]. Although these studies demonstrate an association between physical pain and social disconnection, they do not clarify how to translate these findings to clinical care. One possibility is to develop interventions that target the social context in which pain is suffered through public health partnerships with organizations outside of the health care sector that may facilitate a sense of social connection, such as museums.

Museums may possess several advantageous characteristics for public health initiatives [17]. For example, museums may be less stigmatizing than health care organizations because they do not diagnose or treat medical and mental health problems and are therefore less likely to engender experiences of shame or embarrassment [17], an attribute that may be particularly beneficial for individuals with chronic pain who often suffer from internalized stigma [18] or face stigmatization from their health care providers [19]. Furthermore, many museums offer free or reduced fees for children, students, older adults, and special populations, a practice that lowers barriers to access and encourages regular attendance, two additional characteristics favorable to public health interventions [17]. Several authors have also described how arts engagement in general, and museum attendance in particular, may facilitate a sense of social connection [20–23], which in return may reduce the burden of chronic pain. In addition, given the observation that pain can be modulated at cortical levels by the aesthetic content of stimuli, the museum’s art collection itself may help to reduce pain [24]. Although ambulation in any

context may aggravate certain pain conditions, considering the potential of museums to facilitate a sense of social connection and that social connection may have analgesic properties [9–11,25], we hypothesize that tours of a museum offered to individuals with chronic pain may decrease perceived social disconnection and pain.

Methods

The UCD Institutional Review Board approved this study. Our research team has published a detailed program description for health care and museum professionals wanting to initiate, structure and implement similar programs; [26] provided below is a summary of the intervention’s development. The Director of Integrative Pain Management (DIPM) within the Division of Pain Medicine at the University of California, Davis (UCD), and the lead researcher (IJK) developed Art Rx by initiating a dialogue with leadership at the Crocker Art Museum in Sacramento, California, using an adapted framework for museums and art galleries as partners for public health interventions (Figure 1) [17]. An organizing committee was formed including the lead researcher, the Adult Education Coordinator at the Crocker Art Museum (AEC), and several museum docents. During an initial organizing committee meeting, the lead researcher and the Director of Pain Psychiatry and Behavioral Sciences at UCD, a psychiatrist internist who specializes in pain management, provided an overview of the epidemiology, assessment, and treatment of chronic pain and addressed any concerns that the AEC or docents had regarding working with this population. Through an iterative process comprised of three meetings, the organizing committee agreed to conduct free, monthly docent-facilitated one-hour tours of the museum for any individual with chronic pain and for their family members and/or friends.

Art Rx tours focused on participant experience and dialogue rather than the art object and its history. This emphasis on the viewer rather than the viewed is a common pedagogical approach among public art museums [27] and is particularly important when working with vulnerable or marginalized populations to facilitate inclusivity [17,28,29].

In addition, Crocker Art Museum docents and staff further emphasized inclusivity by, for example, underscoring that the museum is a public organization and encouraging all perspectives on the art objects discussed. Finally, all participants were provided with lightweight stools to enhance comfort and facilitate accessibility. Tours took place in one gallery that was blocked off to the general public when possible to facilitate a sense of connectedness and mitigate any potential mobility issues among participants. Tours included dialogue about 3–5 art objects selected ahead of time by the docents based on their personal interest or expertise, thereby focusing on quality interactions with art objects rather than quantity of objects viewed. Giving docents agency over the

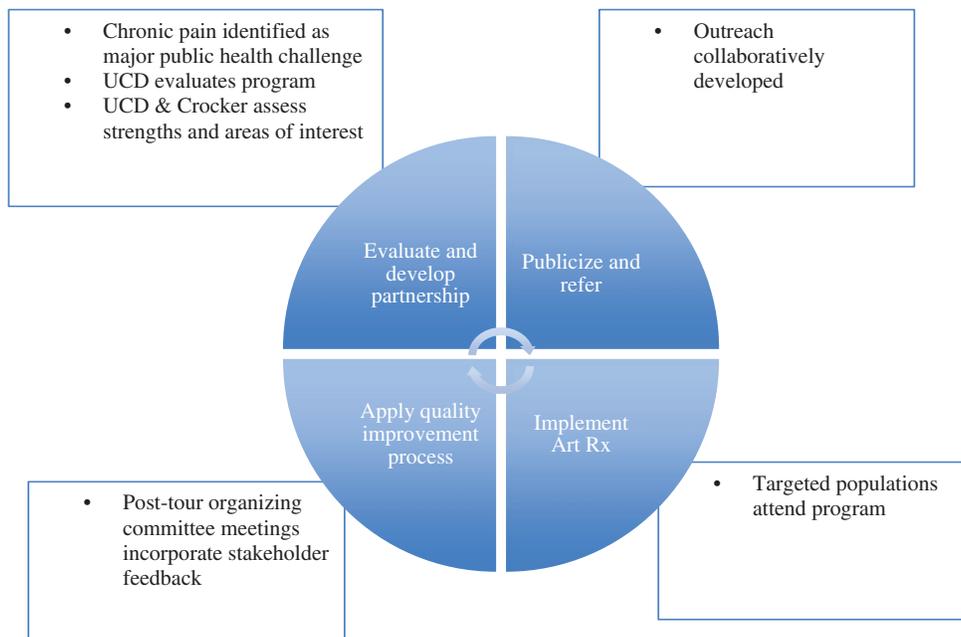


Figure 1. Art Rx partnership framework. Adapted from Camic and Chatterjee. Museums and art galleries as partners for public health interventions. *Perspect Public Health* 2013;133(1):66–71[17].

content of the tours encouraged their participation and engagement with the program. At least two docents facilitated each tour, rotating the responsibility among themselves. The art objects viewed changed each tour in an effort to foster inclusivity and appeal to the broadest audience possible. For example, tours from 2017 included “Women at the turn of the 20th century through the eyes of American painters” and “Landscapes from the Crocker’s permanent collection.” Other tours have focused on objects from the museum’s ceramics, drawings, contemporary art, and antiquities collections.

Participants

Individuals presenting to the museum for an Art Rx tour were informed that UC Davis was conducting a study to assess the feasibility of Art Rx, given institutional review board–approved documentation on their rights and obligations as study participants, and assessed for eligibility if they expressed an interest in participation. Inclusion criteria included age 18 years or older, ability to speak English, and self-identifying as living with chronic pain. Individuals were excluded from the study if they were unable to consent, had previously attended an Art Rx tour, or did not speak English. Participants gave their informed consent before inclusion in the study.

Study Design

This study uses a convergent parallel mixed-methods design [30]. Quantitative survey data collected from a single-group, quasi-experimental pre/post [31] pilot study provide preliminary effectiveness data on Art Rx’s ability to decrease social disconnection and pain among individuals with chronic pain. Qualitative data collected

through semistructured interviews with Art Rx participants explore the feasibility and experience of a museum-based intervention for individuals with chronic pain. The reason for collecting and integrating quantitative and qualitative data in this study is to extend and enrich the understanding of Art Rx through multiple perspectives, increase the internal validity of its findings through triangulation, and explore any apparent incompatibilities in the data. Quantitative and qualitative data are discussed separately in the *Results* section of this manuscript and then examined together in the *Discussion* section.

Quantitative Analysis

The study describes pain intensity and pain unpleasantness using a well-established 0–10 numerical rating scale (NRS) [32]. The NRS has demonstrated high test–retest reliability ($r = 0.89–0.98$, $P < 0.001$) and convergent validity ($r = 0.82–0.92$, $P < 0.001$) [33]. Social disconnection was measured using a 12-item scale (SDS) adapted by Eisenberger [34] in which participants rate the extent to which they feel the “following feelings right now” on a five-point Likert scale (e.g., I feel like being around other people; I feel connected to others). This scale was sensitive to hourly change and had good reliability ($\alpha = 0.84$) [34].

These outcomes were measured immediately before and after the tour, as well as three weeks following the tour. In addition, percent pain relief was assessed by asking participants “Did you experience any pain relief during the tour?” immediately after the tour; participants responding “Yes” then indicated percent pain relief on a scale of 0 to 100. Participants provided satisfaction scores using a five-point Likert scale in the post-tour

questionnaire and demographic information in the pre-tour questionnaire.

This study is a pilot and is not intended to make causal or confirmatory statements; therefore, all statistical tests should be considered exploratory. Descriptive statistics (e.g., means, standard deviation, frequencies, and percentages) were calculated for demographic data and satisfaction scores. Paired *t* tests were conducted on pain intensity and unpleasantness NRS and Social Disconnection Scale scores. To make inferences without strong distributional assumptions and to check the stability of the results, bias-corrected and accelerated (BCa) bootstrapped 95% confidence intervals (CIs; using 1000 resampled data sets) were calculated [35]. Effect sizes for dependent variables were determined using Cohen's *d*, where 0.2 is a small effect, 0.5 is a medium effect, and 0.8 is a large effect [36]. All statistical analyses were performed using SPSS 23.

Qualitative Data Collection and Analysis

The lead researcher (IJK) worked with a multidisciplinary team to develop an interview guide to explore various aspects of the program's feasibility and its potential impact. The multidisciplinary team that helped to develop the interview guide included museum docents and staff, as well as experts in pain (SMF), the social value of arts engagement (DS), integrative medicine (CMW), medical sociology and qualitative methods (DP), and research design (JGJ). Purposive sampling was used to select participants for semistructured interviews to ensure diverse representation in terms of age, gender, and reported pain relief. Purposive sampling aims to ensure inclusion of key constituencies and sufficient diversity within each constituency so that important characteristics can be explored [37]. The lead researcher (IJK) conducted all interviews. The semistructured interview format allowed for coverage of relevant predetermined topics while also allowing for new concepts to emerge [38,39]. Audio-recordings of interviews were transcribed verbatim. The multistage coding process began with the lead researcher (IJK) and a second researcher (DP), a medical sociologist and expert in qualitative methods uninvolved in the Art Rx tours, individually coding the first four interview transcripts. Using a thematic analysis framework [40] to iteratively analyze the transcripts for recurring themes related to the experience and feasibility of Art Rx, the coders came to a consensus on the themes supported by the transcripts and developed a preliminary codebook reflecting these themes. The codebook contained definitions and text examples from interviews. This preliminary codebook was used to code four new transcripts, two by each coder. The coders compared themes from these additional four transcripts with the codebook. New themes and example text were added to the codebook. The revised codebook was used to code the remaining transcripts. The lead researcher (IJK) then individually coded the six remaining transcripts,

checking potential new themes with the second coder (DP) to help ensure validity in coding [41,43]. All qualitative analysis was conducted with the software package MAXQDA 12 [44]. The researchers agreed that data saturation, the point at which no new information was presented on critical elements pertaining to participants' experience with Art Rx and their perspectives on feasibility [30,39], was reached after the 12th interview; an additional two interviews were conducted to help assure saturation.

Results

Quantitative

Docents facilitated 11 tours for this study, and 54 individuals participated, with an average age (SD, range) of 59 (14.5, 18–93) years. The majority of participants were female (65%) and white (78%). Twenty-four percent designated their health status as either "poor" or "fair," 37% as "good," and 24% as "very good" or "excellent" (8 [15%] missing). A majority of participants reported having pain for longer than one year (87%). Sixty-eight percent of participants brought at least one guest (Table 1).

The majority of participants (57%) stated that they experienced pain relief during the tour. Of those who experienced pain relief, the average pain relief reported (SD) was 47% (34.61%). Program satisfaction was high. On average, participants were completely or very satisfied on indicators such as knowledge of staff, registration process, activities conducted, content covered, attentiveness of staff, ability to keep engaged, and the quality of the overall experience. In addition, 93% of participants agreed with the statement "I would come on another Art Rx tour" (Table 2).

On average, participants had higher pre-intervention pain unpleasantness scores ($M = 4.02$, $SD = 2.42$) than postintervention ($M = 3.53$, $SD = 2.61$). This difference—0.49 (BCa 95% CI = 0.06–0.90)—represented a small effect size ($d = 0.20$). Participants also had higher pre-intervention social disconnection scores ($M = 26.00$, $SD = 9.86$) than postintervention ($M = 22.35$, $SD = 9.86$). This difference—3.65 (BCa 95% CI = 1.70–5.73)—represented a moderate effect size ($d = 0.37$). Changes in pain intensity pre- to post-tour were not significant, but they were significant at three-week follow-up (pre $M = 4.14$, $SD = 2.24$; three-week $M = 3.51$, $SD = 2.48$; difference = 0.63, BCa 95% CI = 0.07–1.25, $P = 0.034$, $d = 0.28$) (Table 3).

Qualitative

Fourteen participants (25% of study participants) were interviewed. All interviews were one hour or less ($M = 45$ minutes, range = 35–60 minutes). Quotations are attributed by initial participant number out of 54 (e.g., P19). Nine reported pain relief during the tour.

Table 1. Demographic characteristics of Art Rx participants

Total sample, No. (%)	54 (100.00)
Age, mean (min–max, SD)	59 (18–93, 14.5)
Sex, No. (%)	
Female	35 (64.8)
Male	17 (31.5)
Missing	2 (3.7)
Ethnicity, No. (%)	
Latino/Hispanic	7 (13.0)
Non-Latino/Hispanic	41 (75.9)
Missing	6 (11.1)
Race/ethnicity, No. (%)	
Black/African American	1 (1.9)
White	42 (77.8)
Native Hawaiian/Pacific Islander	1 (1.9)
American Indian/Alaska Native	0 (0)
Asian	2 (3.7)
Other	1 (1.9)
Two or more races	4 (7.4)
Missing	3 (5.6)
Health status, No. (%)	
Poor	3 (5.6)
Fair	10 (18.5)
Good	20 (37.0)
Very good	12 (22.2)
Excellent	1 (1.9)
Missing	8 (14.8)
Chronicity of pain, No. (%)	
Less than 3 mo	1 (1.9)
More than 6 mo and less than 1 y	1 (1.9)
More than 1 y	47 (87.1)
Missing	5 (9.3)
Guests, No. (%)	
Yes	37 (68.4)
No	16 (29.6)
Missing	1 (1.9)
No. of guests, No. (%)	
1	26 (48.1)
2	10 (18.5)
3	1 (1.9)
Missing/no guests	17 (31.5)

Table 2. Pain relief during tour and program satisfaction

Did you experience pain relief during Art Rx?, No. (%)	
Yes	31 (57.4)
No	16 (29.6)
Missing	7 (13.0)
If yes, what % pain relief?, mean (SD)	46.9 (34.61)
Satisfaction,* mean (SD)	
Registration process	4.6 (0.7)
Activities conducted	4.2 (1.0)
Topic or content covered	4.4 (0.9)
Attentiveness of staff	4.6 (0.7)
Level of knowledge of staff	4.6 (0.8)
Ability to keep me engaged	4.3 (0.9)
Quality of experience overall	4.4 (0.8)
I would come to another Art Rx tour,† mean (SD)	5.3 (0.9)

*1 = very dissatisfied; 2 = somewhat dissatisfied; 3 = well satisfied; 4 = very satisfied; 5 = completely satisfied.

†1 = strongly disagree; 2 = disagree; 3 = mildly disagree; 4 = mildly agree; 5 = agree; 6 = strongly agree.

The average age of the interviewees was 55 years, and 62% were female. Transcript segments were first conceptually grouped into codes pertaining to pre-, during, and post-tour experiences; this initial categorization allowed for further analysis of participants' personal histories, the experience of the intervention itself, and the perceived impact of the intervention.

Pain Histories

Participants discussed their personal histories with pain in interviews, focusing on the isolation that results from chronic pain and on their past negative encounters with the health system (Figure 2).

Isolation. Participants identified and described pain as a phenomenon that influences one's physical, psychological, and social life, with the potential to radically alter one's identity. "I am just not who I used to be" recalled one participant (P19), who went on to say, "I am very humiliated by the way my life is now... I don't go anywhere, and I don't do anything anymore." Participants identified isolation due to disability, mood, and critical self-consciousness as pain's main effect on identity, and often described the isolation imposed by pain as taking away personhood and objectifying: "You feel less human and more like a piece of meat" and "You start to feel like a thing, like a symptom" (P30). Unfortunately, for some interviewees, encounters with the health system amplified their experience of isolation.

Negative Health System Encounters. Participants described encounters with the health system as primarily negative because care was felt to be marginalizing, the system was experienced as onerous and difficult to navigate, and treatment was often associated with adverse reactions. One participant (P30) stated, "[The physician] wouldn't know who I was, he'd spend half the time furiously leafing through the computer records trying to find out...and say, 'I'll see you in six months.' And in fact, then I would go home and feel down for three days." Stressing the health care system's disregard for the personal narrative, the participant explained further, "In the medical system, they do not ask for your opinion, they do not want your opinion, and they will discount, even be patronizing of, your opinion."

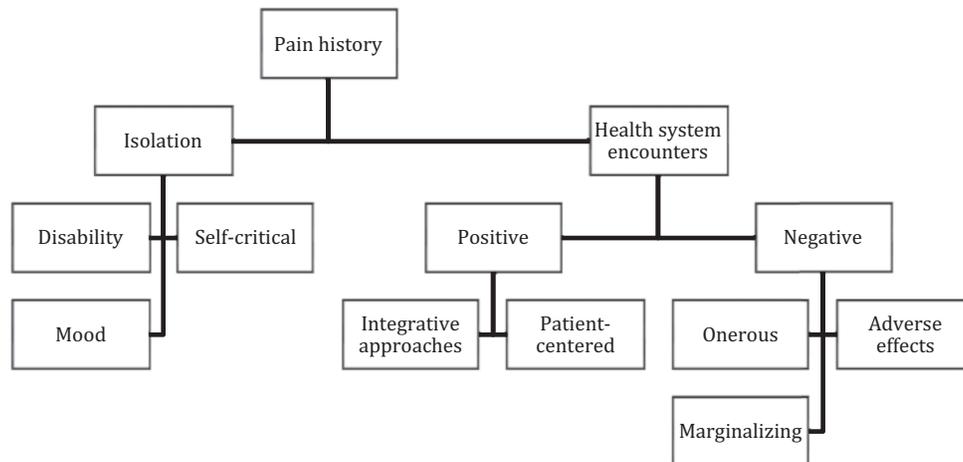
Individuals often reported feeling physically and emotionally compromised due to pain, which made navigating their care difficult. Diminished personal capacity was often compounded by lack of a support system, as one participant (P30) illustrated by stating, "It is very difficult to maneuver around the system if you don't have a healthy aggressive person looking out for you." Participants also associated negative experiences with the health care system with adverse reactions to treatment. Participants described adverse reactions as traumatic; for example, one participant stated (P44), "During the surgery, something went wrong and the blood supply to my foot was compromised. My third toe died. It had to be

Table 3. Outcomes: pain and social disconnection

	Pre	Post	<i>P</i> Value*	BCa 95% CI	Cohen's <i>d</i>	Three-Week Follow-up	<i>P</i> Value*	BCa 95% CI
Pain intensity, mean (SD)	4.14 (2.24)	3.98 (2.41)	0.273	−0.17 to 0.55	0.07	3.51 (2.48)	0.034	0.07 to 1.25
Pain unpleasantness, mean (SD)	4.02 (2.42)	3.53 (2.61)	0.016	0.06 to 0.90	0.20	3.42 (2.79)	0.100	−0.09 to 1.28
Social disconnection, mean (SD)	26.00 (9.86)	22.35 (9.86)	0.000	1.70 to 5.73	0.37	24.72 (10.39)	0.599	−1.71 to 2.89

BCa = bias-corrected and accelerated bootstrap; CI, confidence interval.

*Paired *t* tests.

**Figure 2.** Pain history model.

amputated, and. . . it was a traumatic experience in addition to it being painful. There was pain on many levels.” In addition, interviewees frequently viewed adverse reactions to treatment as a threat to the therapeutic alliance between health care provider and patient, as exemplified by one participant’s (P46) description of her care as mismanaged because her physician prescribed a medication that caused seizures and had “all sorts of tests being run on me that didn’t need to be run on me.” Positive encounters with the health care system, though rarely mentioned, were associated with patient-centered care that often included integrative pain management approaches.

Experience During the Tour

Participants generally experienced Art Rx as a positive experience that facilitated a sense of social connection, citing it as aesthetic, validating, engaging, educational, and restorative. One participant (P46) noted that art is a vehicle for experiencing different, previously unimagined, perspectives that can facilitate a sense of absorption and connectedness, saying in part, “I’m looking at art and. . . I am no longer my body; I am in a place of connection.” The fact that Art Rx took place in a museum was viewed as positive for several reasons. First, the curated space and physical beauty of the museum were viewed as novel, engaging, and a distraction from pain: “[An art museum] is like a whole new world, and it takes me out of where I am at before I walk in” (P1). Second,

some participants experienced the museum’s civic vs medical institutional identity as normalizing and validating, “You don’t feel like you were being a patient. . . . You don’t feel like a lab rat” (P1). Interviewees experienced Art Rx as educational, noting that they learned new things through both the docent’s discussion of art history and their fellow participants’ perspectives. As one individual shared (P40), “I think the conversations about what people see in the art is the most interesting part. It isn’t about a good painting or not good painting; it’s about what different people see.” The experience of Art Rx was often described as restorative—renewing physical, psychological, and social capabilities diminished by ongoing demands [43]. For example, one participant (P20) said, “I was super stressed by family, it was a bad day. . . . After the tour, I was like, ‘I feel good. I’m ok. I can let all that other stuff go.’”

Interviewees often cited the group dynamics within Art Rx as facilitating a sense of social connection. Participants highlighted three specific components of the group dynamic as contributing to a sense of social connection: the ability to bring family members or friends, the docent-facilitated discussion of the art works, which involved hearing new perspectives, and the encouragement to express one’s own views. In addition, participants found Art Rx to be inclusive, not only of varying perspectives but also in terms of the registration process and access. For example, one participant (P46) stated, “Being able to share what my perspective was on the

experience made me feel valued”; this participant, who uses a wheelchair, also noted, “I had people around me that are sitting in chairs and they are at my level. I feel included.” Although the majority of references to the group dynamics of Art Rx were positive, several comments highlighted the potential of group dynamics to be a negative factor in one’s experience. Specifically, one participant (P13) noted feeling different than other members of the group due to her age and her particular pain condition. She stated, “I think I was looking for seeing other people like me, age, and even maybe even a similar condition, so I can connect with them and even talk with them and share this experience with them, but I was the only one.” Another participant (P15) found the experience of talking about art intimidating, sharing, “I got a little insecure with the group. . . . My lack of art knowledge and lack of knowing people that were in there [the group].” This happened in spite of the docents’ explicit orientation that all perspectives on the art and contributions to the conversation were welcome and valuable. Negative experiences at Art Rx, although rare, were associated with feeling physically uncomfortable standing or sitting during the tour and not feeling part of the group.

Ultimately, many participants found that the program and the sense of social connection it facilitated provided distraction from their pain. One interviewee (P20) said, “[Art Rx] took my mind elsewhere,” and sought to describe the interrelationship between the physicality and emotionality of pain: “Physically I still have pain, but I felt good mentally, and I think a part of my pain lessens when I feel good mentally.” For many, the dialogue and social interactions inherent to Art Rx were felt to be the mechanism by which distraction analgesia occurred: “So we get there, and I’m already in pain, but truly we were having this discussion and I just wasn’t thinking about it. I was having a good time” (P13). Ultimately, participants pointed to the sense of engagement that Art Rx facilitated as lessening the burden of pain: “If you’re involved and doing things with people, you’re not shut in; you’re not focused on the pain” (P23).

Impact Beyond the Tour

One important aspect of pain management is the sustainability of the treatment effect. Therefore, it was important to first explore whether participants felt the intervention had any impact on their pain experience and, if so, to explore if this impact was perceived to last beyond the one-hour intervention. Among interviewees who indicated a beneficial response to the intervention, several noted that it also raised awareness that social connection could mitigate the burden of their chronic pain in the longer term. As one participant said (P46), “Well, if anything it drives home for me how important it is to make sure that I get out, that I—in a way, it should be an aspect of my health regime.” Several participants acted on this insight by, for example, getting together with Art

Rx participants socially after the tour, joining other art-based groups in their community, such as a chorus, or attending another Art Rx tour. In addition, Art Rx created a sense of joyful anticipation: “I can’t wait for the next Art Rx” (P46); as well as a fond memory: “I think about it. I remember with a smile. . . . I had never talked about art with anyone before” (P12). The program was also felt to facilitate a new and enhanced relationship to art: “I give more consideration of what was the intention of the artists. . . . I am starting to look at [art] and say, ‘OK, that’s what I feel—now what did the artist intend here? What was the artist trying to provoke in me? What is it about this piece of art that makes me feel a feeling?’” (P12).

One participant framed their experience of Art Rx as “building a skill” (P40), referring to both art appreciation and to the use of social engagement as analgesia. A prevalent theme among participants was how social connection in general, and Art Rx in particular, was a novel piece in the puzzle of successful pain management. One participant (P12) stated, “If you are teaching us something that we can use, if you’re exposing us to something that becomes a tool for us, then [Art Rx] is having a lifelong impact, and that shouldn’t be minimized.”

Discussion

This study addresses the feasibility of a unique museum-based intervention targeting chronic pain, but also provokes reflection on the widely acknowledged but seldom addressed social dimension of pain. A recent article by Williams and Craig [6] draws attention to this failure as part of a call for an overall revision of the definition of pain. The new proposed definition, which explicitly recognizes pain’s sociality, states, “Pain is a distressing experience associated with actual or potential tissue damage with sensory, emotional, cognitive, and social components” [6]. Nevertheless, clinical and research efforts disproportionately concentrate on the intrapersonal dimensions of pain [44]. Clearly an essential component of understanding pain’s impact on the host includes the pathophysiological etiology of pain in specific disease states, the biological mechanisms by which tissue injury is transduced to nociceptive nerves, the mechanisms by which these afferent signals are transmitted centrally, and the process of translating and modulating these signals through cognition and behavior [44]. However, an understanding of the intrapersonal dimensions of pain is insufficient if it ignores the social factors known to impact both pain intensity and pain-related outcomes [4,45]. Despite early evidence that the social context in which pain is experienced may be a potentially valuable area for research and treatment [9–11,25], it remains insufficiently studied [4,5]. Faced with the dual public health crises of chronic pain [46] and misuse of opioid analgesics [47], a health care workforce unprepared to meet these challenges [46,48], and knowledge

that social context affects pain [5–7], it is essential that the social component of pain is both acknowledged *and* addressed.

Nonclinical organizations that have traditionally existed outside of the public health sector may be valuable partners when developing programs and interventions to target the social dimension of pain. This study represents a step in this direction, demonstrating that docent-led tours in an art museum for individuals with chronic pain are feasible. Participants expressed satisfaction with various dimensions of the program, from registration to the quality of the overall experience. They found Art Rx to be, among other things, inclusive, validating, and socially engaging. These qualities stood in stark contrast to the isolating nature of chronic pain described in their personal histories and the negative encounters many of them had with the health care system. The interviews revealed opposing juxtapositions between participants' pain history narratives and their experience of Art Rx: isolation vs social engagement, marginalization vs validation, and difficult vs easy-to-navigate processes. These contrasts highlight the value participants generally ascribed to the program. Qualitative data from this study are consistent with reports that individuals with chronic pain often experience stigma and isolation [18,19], an experience that can be amplified by negative encounters with health care systems [19,46,49]. Socially based interventions for individuals with chronic pain supported by health care organizations, such as Art Rx, may help to mitigate not only the experience of isolation, but also the distressing associations that many individuals with chronic pain have with the health care system.

A growing appreciation for social determinants of health [50–53] and the positive influence of civic participation on health [50] have created new opportunities and challenges for organizations such as museums, which have traditionally not been involved in public health efforts [54]. Many museums identify as having a social role and have made great efforts to address the needs and interests of the communities they serve [55], including the expansion of activities to socially excluded populations [21,56,57]. Museums may be further incentivized to investigate their potential as public health partners given the context of a national decline in museum attendance, which dropped 8% between 2002 and 2012 [58]. Indeed, a number of museums offer public health programming [17], but none that we are aware of target individuals with chronic pain. And this study is the first of a museum-based intervention for chronic pain.

A strength of this study is the use of mixed methods, which integrates qualitative and quantitative approaches to theoretically maximize internal validity through triangulation and which can be particularly useful for understanding real-life contexts and for exploring incongruities in the data [38]. For example, given the “dose” of the intervention—a single one-hour tour—changes in

outcomes at three-week follow-up were not expected. Rather, follow-up assessment was conducted to help determine methodological feasibility in regards to retention rates. Nonetheless, interview data suggest that some participants felt that Art Rx had benefits extending beyond the tour that were not captured in the quantitative data set, such as an appreciation for the therapeutic benefits of social engagement, relationships formed as a result of Art Rx, and the sense of validation that Art Rx appeared to engender. Although unanticipated, these preliminary findings were encouraging. In addition, several interviewees who did not indicate a quantitative improvement in pain or social disconnection still felt that the experience had a positive impact on their lives. For example, one participant (P19) who reported increased pain directly after the tour stated, “I am proud of myself. . . . I was not self-conscious the whole time I was there, and I usually am wherever I am because of how much I have changed. . . . Not only did [I] do it, but [I] had a wonderful time.” She goes on to say, “My pain got worse, but overall, in the big picture, I think [Art Rx] can reduce pain. . . . If I am engaged in doing things, even if it means getting up and going out, even if it causes me a little bit more pain, when I go to bed at night, I still feel better about things when I get up in the morning.”

Of note is this intervention's distinction from art therapy. Art therapy is used in a number of contexts and usually involves art-making with a small number of participants and the expert facilitation of a trained art therapist [29]. A small body of quantifiable data exists to support its effectiveness in treating a variety of symptoms, age groups, and disorders [59]. Art Rx's ability to accommodate groups of varying sizes without reliance on facilitators with specialized health care training may make it a more generalizable intervention than formal art therapy [29]. In addition, attending a museum-based program without the involvement of health care professionals may be less stigmatizing and more normalizing than art therapy as it does not involve the explicit treatment or diagnosis of medical or mental health problems [17]. However, incorporating the expertise of a trained art therapist and the use of formal art-making (vs arts engagement) may be of additional benefit and more appropriate when working with certain vulnerable populations.

This study has several limitations. Its relatively small sample size and overall design (including the lack of a comparison group and randomization) make it susceptible to selection bias and do not allow for causal inferences, as alternative explanations of findings cannot be ruled out [31]. In addition, chronic pain is a heterogeneous and complex condition with varied etiologies affecting nearly one in four Americans [46]; therefore, this study's broad self-reported inclusion criteria create another limitation to the generalizability and interpretation of its results. Resource constraints required the lead researcher (IJK) to serve as this study's interviewer, thereby introducing the potential for biased responses and

interpretation. In an effort to mitigate this potential bias, a researcher uninvolved with the program (DP) helped to develop the interview guide and analyze qualitative data. Questions that explicitly challenged the feasibility and significance of the program were intentionally asked to seed and encourage critical feedback. Nevertheless, interviewees' comments were largely positive. Although this study's overall design was appropriate for an early-stage feasibility study and the use of mixed methods helped to maximize internal validity [38], the use of a single-group quasi-experimental design does not allow for causal statements. Therefore, this study's preliminary outcome data should be interpreted with caution and warrant future experimental studies to explore the mechanisms, durability, and predictors of sociogenic analgesia.

Conclusion

This study is the first to explore the feasibility and effect of a museum-based intervention to decrease social disconnection and pain among individuals with chronic pain. Results from this pilot study suggest that docent-led tours in an art museum for individuals with chronic pain are a feasible intervention that may provide relief from perceived social disconnection and pain.

Acknowledgments

The authors gratefully acknowledge contributions from the team at the Crocker Art Museum, including Erin Dorn, Stacey Shelnut-Hendrick, the Art Rx docents, and the staff for their stewardship and support of this program. We also thank Kyla Wiegand, Research Assistant.

References

- Merskey H, Bogduk N. Task Force on Taxonomy of the International Association for the Study of Pain: Classification of Chronic Pain. Description of Pain Syndromes and Definitions of Pain Terms. Seattle, WA: IASP Press; 1994.
- Turk DC, Monarch ES. Biopsychosocial perspective on chronic pain. In: Psychological Approaches to Pain Management: A Practitioner's Handbook. Edited by Dennis C. Turk and Robert J. Gatchel. Third Edition. New York and London: The Guilford Press. 2018:3–24.
- Gatchel RJ, Peng YB, Peters ML, Fuchs PN, Turk DC. The biopsychosocial approach to chronic pain: Scientific advances and future directions. *Psychol Bull* 2007;133(4):581.
- Blyth FM, Macfarlane GJ, Nicholas MK. The contribution of psychosocial factors to the development of chronic pain: The key to better outcomes for patients? *Pain* 2007;129(1):8–11.
- Hadjistavropoulos T, Craig KD, Duck S, et al. A biopsychosocial formulation of pain communication. *Psychol Bull* 2011;137(6):910.
- Williams AC, Craig KD. Updating the definition of pain. *Pain* 2016;157(11):2420–2423.
- Craig KD. Social communication model of pain. *Pain* 2015;156(7):1198–9.
- Lee RM, Robbins SB. The relationship between social connectedness and anxiety, self-esteem, and social identity. *J Couns Psychol* 1998;45(3):338–45.
- Master SL, Eisenberger NI, Taylor SE, et al. A picture's worth partner photographs reduce experimentally induced pain. *Psychol Sci* 2009;20(11):1316–8.
- Younger J, Aron A, Parke S, Chatterjee N, Mackey S. Viewing pictures of a romantic partner reduces experimental pain: Involvement of neural reward systems. *PLoS One* 2010;5(10):e13309.
- Eisenberger NI, Master SL, Inagaki TK, et al. Attachment figures activate a safety signal-related neural region and reduce pain experience. *Proc Natl Acad Sci U S A* 2011;108(28):11721–6.
- Apkarian AV, Bushnell MC, Treede RD, Zubieta JK. Human brain mechanisms of pain perception and regulation in health and disease. *Eur J Pain* 2005;9(4):463.
- Peyron R, Laurent B, Garcia-Larrea L. Functional imaging of brain responses to pain. A review and meta-analysis. *Neurophysiol Clin* 2000;30(5):263–88.
- Price DD. Psychological and neural mechanisms of the affective dimension of pain. *Science* 2000;288(5472):1769–72.
- Rainville P. Brain mechanisms of pain affect and pain modulation. *Curr Opin Neurobiol* 2002;12(2):195–204.
- Richter EO, Davis KD, Hamani C, et al. Cingulotomy for psychiatric disease: Microelectrode guidance, a callosal reference system for documenting lesion location, and clinical results. *Neurosurgery* 2004;54(3):622–30.
- Camic PM, Chatterjee HJ. Museums and art galleries as partners for public health interventions. *Perspect Public Health* 2013;133(1):66–71.
- Waugh OC, Byrne DG, Nicholas MK. Internalized stigma in people living with chronic pain. *J Pain* 2014;15(5):550.e1–10.
- Cohen M, Quintner J, Buchanan D, Nielsen M, Guy L. Stigmatization of patients with chronic pain: The extinction of empathy. *Pain Med* 2011;12(11):1637–43.
- White M. *Arts Development in Community Health: A Social Tonic*. Oxon, UK: Radcliffe Publishing; 2009.
- Sandell R, Nightingale E. *Museums, Equality and Social Justice*. Abingdon, UK: Routledge; 2013.
- Silverman LH. *The Social Work of Museums*. Abingdon, UK: Routledge; 2009.
- Sommer D. *The Work of Art in the World: Civic Agency and Public Humanities*. Durham and London: Duke University Press; 2013.

24. de Tommaso M, Sardaro M, Livrea P. Aesthetic value of paintings affects pain thresholds. *Conscious Cogn* 2008;17(4):1152–62.
25. Eisenberger NI. The neural bases of social pain: Evidence for shared representations with physical pain. *Psychosom Med* 2012;74(2):126.
26. Koebner IJ, Fishman SM, Paterniti D, Sommer D, Ward D, Joseph J. Curating Care: The Design and Feasibility of a Partnership Between an Art Museum and an Academic Pain Center. *Curator: The Museum Journal* 2018;61(3).
27. Mayer MM. Can philosophical change take hold in the American art museum? *Art Educ* 1998;51(2):15–9.
28. Todd C, Camic PM, Lockyer B, Thomson LJ, Chatterjee HJ. Museum-based programs for socially isolated older adults: Understanding what works. *Health Place* 2017;48:47–55.
29. O'Neill M. Cultural attendance and public mental health—from research to practice. *J Public Mental Health* 2010;9(4):22–9.
30. Creswell JW. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Thousand Oaks, United States; London, United Kingdom; New Delhi, India: Sage; 2013.
31. Shadish WR, Cook TD, Campbell DT. *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*. Boston, United States: Wadsworth Cengage Learning; 2002.
32. Farrar JT, Young JP Jr, LaMoreaux L, Werth JL, Poole RM. Clinical importance of changes in chronic pain intensity measured on an 11-point numerical pain rating scale. *Pain* 2001;94(2):149–58.
33. Sendlbeck M, Araujo EG, Schett G, Englbrecht M. Psychometric properties of three single-item pain scales in patients with rheumatoid arthritis seen during routine clinical care: A comparative perspective on construct validity, reproducibility and internal responsiveness. *RMD Open* 2015;1(1):e000140.
34. Eisenberger NI, Inagaki TK, Mashal NM, Irwin MR. Inflammation and social experience: An inflammatory challenge induces feelings of social disconnection in addition to depressed mood. *Brain Behav Immun* 2010;24(4):558–63.
35. Efron B, Tibshirani RJ. *An Introduction to the Bootstrap*. Washington DC: Chapman and Hall/CRC; 1994.
36. Cohen J. *Statistical Power Analysis for the Behavioral Sciences*. Revised ed. New York: Academic Press; 1977.
37. Ritchie J, Lewis J. *Qualitative Research Practice: A Guide for Social Science Students and Researchers*. Thousand Oaks, United States; London, United Kingdom; New Delhi, India: Sage; 2003.
38. Creswell JW, Klassen AC, Plano Clark VL, Smith KC. *Best Practices for Mixed Methods Research in the Health Sciences*. Bethesda, MD: National Institutes of Health; 2011.
39. Lofland J, Lofland LH. *Analyzing Social Settings*. Belmont, CA: Wadsworth Publishing Company; 2006.
40. Boyatzis RE. *Transforming Qualitative Information: Thematic Analysis and Code Development*. Thousand Oaks, United States; London, United Kingdom; New Delhi, India: Sage; 1998.
41. Maxwell JA. Understanding and validity in qualitative research. *Harvard Educ Rev* 1992;62(3):279–301.
42. VERBI Software. (2017). *MAXQDA 2018 Online Manual*. Retrieved from <https://www.maxqda.com/help-max18/welcome> (accessed July 18, 2018).
43. Staats H, Hartig T. Alone or with a friend: A social context for psychological restoration and environmental preferences. *J Environ Psychol* 2004;24(2):199–211.
44. Craig KD. Putting the social back in the biopsychosocial model of pain. In: Sathis Cooper, Kopano Ratele, eds. *Western Psychology. Psychology Press; 2014:127. Psychology Serving Humanity: Proceedings of the 30th International Congress of Psychology, London and New York; Volume 2.*
45. Clay FJ, Newstead SV, Watson WL, et al. Bio-psychosocial determinants of persistent pain 6 months after non-life-threatening acute orthopaedic trauma. *J Pain* 2010;11(5):420–30.
46. Committee on Advancing Pain Research, Care, and Education, Institute of Medicine. *Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research*. Washington DC: The National Academies Collection; 2011.
47. Okie S. A flood of opioids, a rising tide of deaths. *N Engl J Med* 2010;363(21):1981–5.
48. Fishman SM, Young HM, Lucas Arwood E, et al. Core competencies for pain management: Results of an interprofessional consensus summit. *Pain Med* 2013;14(7):971–81.
49. Slade SC, Molloy E, Keating JL. Stigma experienced by people with nonspecific chronic low back pain: A qualitative study. *Pain Med* 2009;10(1):143–54.
50. Marmot M, Allen J, Goldblatt P, et al. *Fair society, healthy lives: Strategic review of health inequalities in England post-2010*. <http://www.instituteofhealthequity.org/resources-reports/fair-society-healthy-lives-the-marmot-review> (accessed July 19, 2018).
51. Marmot M. Social determinants of health inequalities. *Lancet* 2005;365(9464):1099–104.
52. Koh HK, Piotrowski JJ, Kumanyika S, Fielding JE. Healthy people: a 2020 vision for the social determinants approach. *Health Educ Behav* 2011;38(6):551–57.
53. Commission on Social Determinants of Health. *Closing the Gap in a Generation: Health Equity Through Action on the Social Determinants of*

- Health. Final Report of the Commission on Social Determinants of Health. Geneva: World Health Organization. 2008.
54. Chatterjee H, Noble G. *Museums, Health and Well-Being*. Abingdon, UK: Routledge; 2016.
55. Jung Y. The art museum ecosystem: A new alternative model. *Mus Manag Curatorship* 2011;26(4):321–38.
56. Coffee K. Cultural inclusion, exclusion and the formative roles of museums. *Mus Manag Curatorship* 2008;23(3):261–79.
57. Sandell R. Museums as agents of social inclusion. *Mus Manag Curatorship* 1998;17(4):401–18.
58. National Endowment of Art. *How a Nation Engages with Art: Highlights from the 2012 Survey of Public Participation in the Arts*. National Endowment of Art, Research Report 57. Washington, DC: National Endowment of Art; 2013.
59. Slayton SC, D'Archer J, Kaplan F. Outcome studies on the efficacy of art therapy: A review of findings. *Art Ther* 2010;27(3):108–18.