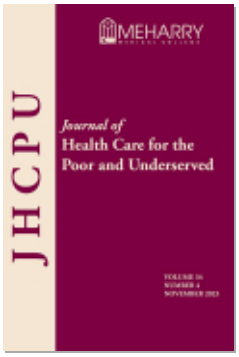
Tattoo Removal in People of Color Who Were Formerly Incarcerated or Were Gang Members: Complications and Best Practices



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Tattoo Removal in People of Color Who Were Formerly Incarcerated or Were Gang Members: Complications and Best Practices

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Abstract: There are limited data about the tattoo removal process in formerly gang-involved and incarcerated people of color. This single center retrospective study was conducted on patients treated at Homeboy Industries' Ya'Stuvo Tattoo Removal Clinic between January 2016–December 2018. It reviewed data on 2,118 tattoos, and a representative sample of 502 patients was used to conduct our analysis. Treatment on 118 of the tattoos (5.57%) resulted in at least one complication (hypo- or hyper-pigmentation, keloids, or scarring). Patients who experienced tattoo removal complications (7.3%) were less likely to return to complete the removal process. More complications were experienced with higher fluences of energy, on tattoos placed by professional artists, on colored tattoos, and tattoos on clients who had a greater number of treatments. The study highlights complications and best practices in tattoo removal in people of color, a process critical to the reintegration and gang disengagement of this vulnerable population.

Key words: Tattoos, gang affiliation, incarcerated, underserved populations, laser tattoo removal, complications, best practices.

While tattoos are becoming increasingly common and are often perceived as a form of self-expression among the general population, they are also frequently associated with past or present gang involvement, propensity for risk-taking, and prison.[1–2] Further, prison tattoos carry additional health risks including hepatitis C, HIV, and other unknown risks due to variable ink composition and application process.[3–5] Due to these risks and stigma, negative attitudes toward the presence of visible tattoos on the face, neck, and hands often pose a major barrier to those seeking to reintegrate into civil

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society, gain meaningful employment, and, most importantly, live safely after leaving gang and prison life.[2] Consequently, tattoo removal services can be transformational in reducing marginalization and enabling former gang members to successfully effect positive change in their lives.[6]

The city of Los Angeles is home to one of the largest gang populations in the world, of which the vast majority belong to minority African American or Hispanic ethnic groups.[1,7] Homeboy Industries (HBI), based in East Los Angeles, operates a large gang intervention and rehabilitation program in which laser tattoo removal is by far its most highly sought-after clinic service. Over 4,000 clients benefit every month from laser treatments administered free of charge by medical volunteers at Ya'Stuvo Tattoo Removal Clinic.[8]

Pioneered in the late 1960s and early 1970s, laser tattoo removal is commonly thought to be safe and effective with minimal temporary side effects limited mainly to pain, blistering, erythema, crusting, and edema immediately following treatments.[9] The removal process includes using pulse dye laser machines to target and break up ink within the epidermis of the skin. Most data on tattoo removal best practices are based primarily on limited literature skewed toward non-Hispanic White, college-educated individuals with professional-grade tattoos.[10] It is commonly accepted that complications such as hypo- or hyperpigmentation occur at higher rates following laser treatment of darker-skinned individuals due in part to the interaction of melanin pigment and lasers.[11,12] However, there is a paucity of literature describing actual tattoo removal trends and outcomes, including complications, in the predominantly Latinx and African American population served by HBI.[1] The lack of well-documented tattoo removal practice in darker-skinned patients is of particular concern in an already vulnerable target population[2,13] seeking a safe and effective manner of divesting themselves of gang-related tattoos.

To better study tattoo removal in darker-skinned individuals, HBI and Keck School of Medicine of USC (KSOM) collaborated, analyzing data from the Ya'Stuvo Tattoo Removal Clinic. This is to our knowledge, the largest effort to characterize long-term outcomes of laser tattoo removal in the formerly incarcerated community. The purpose of this study is to analyze outcome data of (a) the tattoo removal process in darker-skinned patients who were formerly incarcerated or gang-involved; (b) the complications in patients of color represented in this sample; and to (c) suggest optimal counseling guidelines for darker-skin pigments; and (d) to inform best training practices for health care providers who remove tattoos in this vulnerable community.

Methods

Homeboy Industries. The current study is a retrospective chart review of patients who received laser tattoo removal services at HBI's Ya'Stuvo Tattoo Removal Clinic in Los Angeles between January 2016 to December 2018. The clinic offers free tattoo removal to the community, with no eligibility criteria for new patients, including existing health conditions or geographic residence. Patients include participants from the HBI 18-month work-training program (mostly formerly gang-involved and previously incarcerated individuals), self-referred community clients, and referrals from local organizations

(substance use and mental health treatment nonprofits) and law enforcement agencies. Tattoo removal is provided to over 4,000 patients per year by a team of 30 volunteer clinicians, including physicians, physician assistants, nurse practitioners, and dentists. Clinicians' specialties span a wide range of medical fields, including dermatology, family medicine, emergency medicine, plastic surgery, and psychiatry.

This study was reviewed by the LA Biomed Research Institute. It was determined by the John F. Wolf Human Subjects Committee (1) that the proposed activity, as it pertains to submission reference #048108, is not human subject research as defined by DHHS and/or FDA regulations.

Patient selection. All patients who receive services at HBI have their demographic information, including date of birth, ethnicity, race, and address stored in the clinic's tracking platform, which at the time of data entry was FileMakerPro. However, patient tattoo removal intake information (i.e., tattoo descriptions, reasons for getting or removing tattoos, medical history, and laser treatment settings) are recorded on paper charts stored onsite. Given the large patient volume, a representative sample (n = 1,406) was randomly selected from paper charts of patients treated anytime between 2016 and May 2018 (N = 8,364) and all treatments represented in the paper charts were entered into a secure electronic database, across all years of being a patient of HBI. Patient charts that were missing date of birth, race, ethnicity, sex, or ZIP code were excluded.[1] Individuals or tattoos with few treatments provide little information in regards to removing tattoos, thus we excluded all patients who had fewer than three total treatments. While we recognize that this is a study limitation, may lead to selection bias, and underestimate complication rates in our final sample, for purposes of this study the authors selected three treatments as inclusion criteria for participants. In addition, only tattoos that had at least 90% or more of the possible treatment data, when comparing this treatment data to treatment dates in FileMakerPro, were included in the final sample. The final sample dataset included 502 individuals and 2,118 tattoos, representing 17% of the total number of patients with three or more treatments who were treated in 2016, 2017, and 2018. The racial and ethnic demographics and age of our final sample were proportional and consistent with the overall population.[1]

Data. Patient demographic data included patient age, sex, ZIP code, race, ethnicity, total number of treatments and tattoos treated, and Fitzpatrick skin type (skin type scale, ranging from very fair—I to very dark—VI, determined by genetic disposition and reaction to sun exposure).[14] Fitzpatrick skin type was determined from paper chart photographs whose quality was variable. To correct for this, two independent raters viewed and rated patient Fitpatrick skin type photos comparing them to a computer generated Fitzpatrick skin type color chart with a rater agreement of 45%. While this reflects a low agreement, patients mostly had Fitzpatrick skin types of III to IV, thus complication rates by differing skin types were not a focus of this study. Data also included the variables specific to individual tattoo characteristics: the total number of treatments, first treatment date, body location, tattoo description, color, tattoo age, if the tattoo was placed by a professional or amateur artist, and if the tattoo was a "cover up" or removal completed. Tattoo completion was determined either from (1) documentation notes by treatment providers in the paper charts or (2) the tattoo no longer being included on subsequent treatment paper charts after notes of fading by

prior treatment providers. Finally, the tattoo removal treatment data included health care provider performing the treatment, the machine type, model number, removal settings to include fluence (amount of energy delivered per area of laser treatment), Hz (pulses of energy delivered per second), spot size (specific area of laser focus), wavelength of light (varied based on ink color), and any complications that occurred during the removal process (such as scarring, hyperpigmentation, hypopigmentation, and keloid formation).

Statistical analyses. The sample data were analyzed and interpreted in collaboration with the University of California, Los Angeles (UCLA), Department of Mathematics.[15] Both parametric and nonparametric tests of significance were used to identify tattoo-level and patient demographic characteristics strongly correlated to complication occurrence. Two sample proportion z-tests as well as the chi-square test of independence for more than two sample proportions (k-samples) were used to observe differences in proportions across different patient demographics and tattoo level factors with pairwise comparisons. Modern machine learning algorithms were also applied to the tattoo data. Treatment-level data were made of time series (i.e., sequences of appointments for each tattoo and patient) and treatment data across all parameters were characterized using sample means and standard deviations. All computations were done with R-4.0.3. All computing was done on a Linux machine running Ubuntu 20.04 with an Intel 10700K processor.[15]

Results

Sample. Descriptives of the 502 patients in the sample are shown in Table 1. Most patients (75%) were between the ages of 20–39 years old, with the average age at first visit being 30.5 years old (Table 1). There was a slight predominance of male patients (56%) over female patients (44%), and 86% of patients identified as Black or Latinx, consistent with the overall population that HBI serves.

Skin type. Fitzpatrick skin types were available for 443 of the 502 patients in the sample, the majority of which (84%) were Fitzpatrick skin types III or IV. There was with little variability in the skin tones of our patient sample.

Individuals in the sample had a total of between one and 21 treated tattoos (M = 4), although the majority of individuals (74%) had up to only five treated tattoos represented in the sample. Nearly 63% of the 2,118 tattoos in the final data were treated from three to 10 times each, representing 69% of individuals in the sample; another 24% of tattoos were treated up to 20 times. The most common areas for tattoo removal were the upper extremities (47%), face (12%), back (11%), and neck (10%). Of our sample of 2,118 tattoos, 163 were deemed to be completed.

Complication occurrence. We found a statistically significant difference between the patients who experienced a complication during the tattoo removal process and the likelihood that the patient would complete the removal process (decreased likelihood that a patient would complete their tattoo removal if they experienced a complication). Of our sample of 2,118 tattoos, 118 (5.57%) were found to have experienced at least one complication including hypo- and hyper-pigmentation, keloids, and scarring (Figure 1).

Complications also influenced completion rates. In fact, of the patients who did not

Table 1.

DEMOGRAPHICS OF TATTOO REMOVAL PATIENT SAMPLE (N = 502)

	Study Sample	
Demographics	**Number of patients**	**Percent of Total**
Patient Age		
14–19	44	9%
20–29	219	44%
30–39	155	31%
40–49	62	12%
50+ (max 74)	22	4%
Race		
American Indian or Alaskan Native	5	1%
Asian	9	2%
Biracial or Multiracial	15	3%
Black or African American	44	9%
Latino/Chicano/Hispanic	385	77%
Native Hawaiian or Other Pacific Islander	2	0%
Some Other Race	6	1%
White or Caucasian	36	7%
Ethnicity		
Hispanic or Latino	383	76%
Not Hispanic or Latino	119	24%
Gender		
Female	221	44%
Male	281	56%
Fitzpatrick Skin Types		
Type II	46	10%
Type III	169	38%
Type IV	203	46%
Type V	22	5%
Type VI	3	1%

experience complications, 14.4% (n = 288) completed their tattoo treatments, compared with 7.3% (n = 9) who completed the removal process of those who experienced complications during their removal process (two-sample Z test; p = .0083).

Professional vs. amateur. Tattoos that were reported by the patient as being performed by a professional tattoo artist were statistically more likely to be associated with complications than tattoos by amateur artists. Of the patients who had their tattoos done by a professional, 9.4% (n = 36 of 385) experienced a complication while those who had tattoos done by an amateur artist experienced complications at a rate of 4.3%

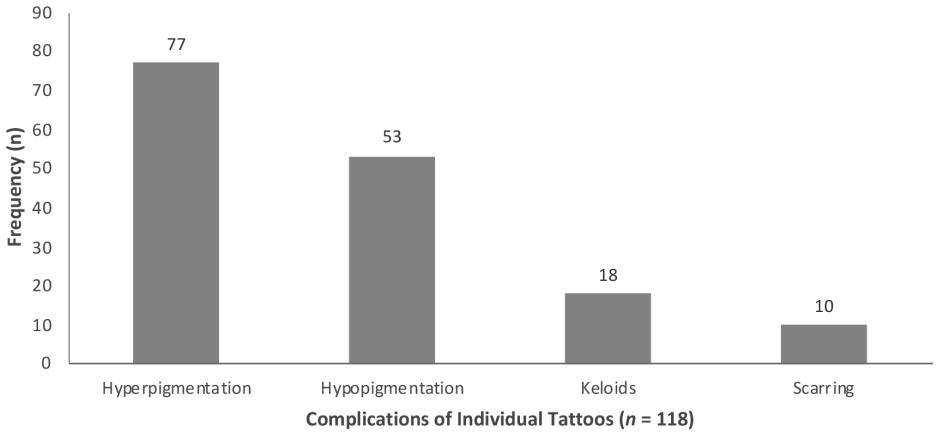

Figure 1. Tattoo removal complication types and occurrence.

(n = 33 of 769), which was found to be statistically significant using a two-sample Z test (p = .001).

Color. Tattoos that were reported by the patient to include colors such as red, green, or yellow are statistically more likely to experience complications than blue or black ink tattoos. Of those patients who had tattoos with solely black or blue ink, 4.9% (n = 57 of 1,141) experienced complications, while those with colored tattoos experienced complications at a rate of 10.8% (n = 19 of 175), which was found to be statistically significant using a two-sample Z test (p = .0035).

Total number of treatments per tattoo. A greater number of total treatments on a single tattoo, the total numbers of tattoos on a patient, and the total overall number of treatments a patient has undergone are all related to increased complication rates. Figure 2 (top) shows results from pooling all of the tattoos from different patients together and then splitting them into quarters based on the total number of treatments by tattoo as follows: Q1= up to four treatments (n = 331), Q2= five to seven treatments (n = 418), Q3= eight to 12 treatments (n = 386), Q4= 13 treatments or more (n = 505; maximum number of treatments on a single tattoo was 65). Complication rates of the four different groups were as follows: Q1= 2.4%, Q2=3.3%, Q3=5.1%, and Q4=12.3% (p = 6.51e–10).

Total number of treatment sessions per patient. A similar methodology was applied to the number of treatment sessions that a given patient came in for, with groups as follows: Q1= up to 11 sessions (n = 122), Q2= 12–24 sessions (n = 116), Q3= 25–52 sessions (n = 117), Q4= 53 sessions or more (n = 122, maximum number of treatments on a single tattoo was 72). Figure 2 (middle) shows the complication rates of the 4 different groups, which were as follows: Q1= 4.9%, Q2=6%, Q3=9.4%, and Q4=24.6% (p = 1.35e–06).

Fluence. Greater mean fluence applied to a tattoo is related to increased likelihood of complication occurrence. Complication rates by mean fluence applied to individual tattoos, split into quarters as follows: Q1= up to 1.44 J/cm^2 (n = 508), Q2= up to

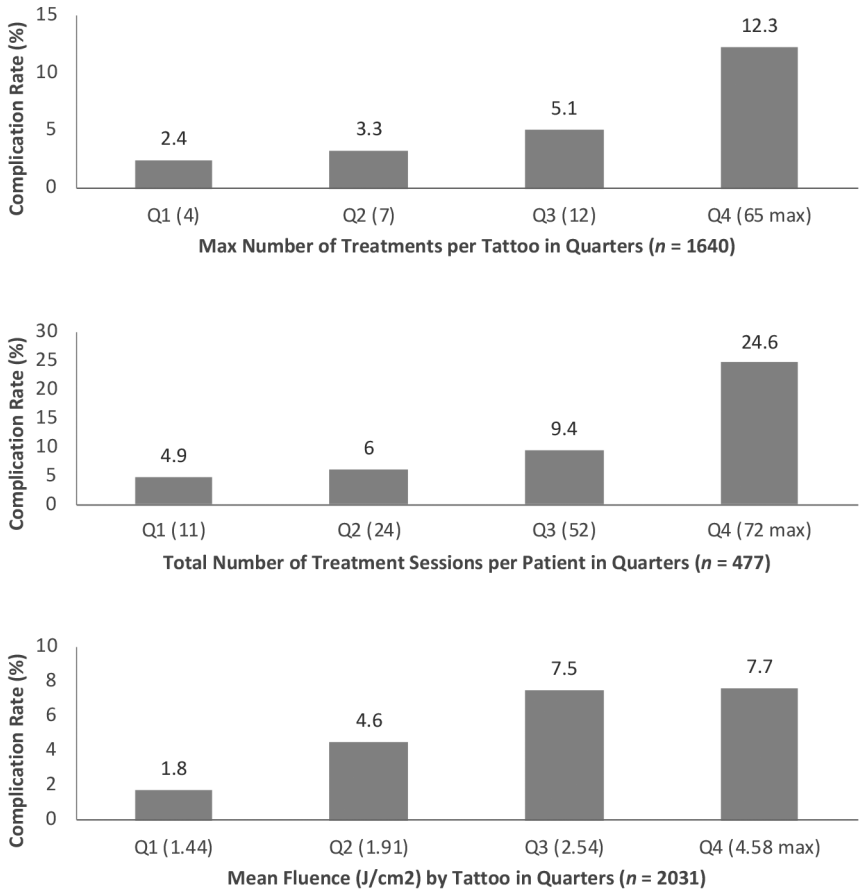

Figure 2. Tattoo removal complication occurrence within groups.

1.91 J/cm^2 (n = 505), Q3= up to 2.54 J/cm^2 (n = 509), Q4= up to 4.58 J/cm^2 (n = 509). Figure 2 (bottom) shows the complication rates of the four different groups, which were as follows: Q1= 1.8%, Q2=4.6%, Q3=7.5%, and Q4=7.7% (p = 3.53e–05).

Response-factor relationships between complication rates and other variables that were hypothesized to influence complication rates, such as average number of days between appointments, tattoo age, and patient age were not found to be statistically significant. Between groups of tattoos that experienced complications and those that did not, the variation in average laser fluence; overall change in laser fluence between the first and last appointment; average spot size; and overall change in laser spot size between the first and last appointment were all found not to be statistically significant. Patient sex, ethnicity, Fitzpatrick skin type, and being above the median age were not statistically related to complication occurrence within a recorded treatment sequence, independent of whether a patient completed the entire treatment process.

Discussion

Tattoo removal process in darker-skinned patients who were formerly incarcerated or gang-involved. Our study examined a large cohort of darker-skinned patients, most of whom had been recently incarcerated and/or were formerly gang-involved to determine common factors for complication occurrence and inform best practices for tattoo removal in this population. There are few studies that examine tattoo removal in this vulnerable population and still fewer that examine potential complications in tattoo removal in people of color as described below. We found an overall complication rate (described as hypo- or hyper-pigmentation, scarring, and keloids) of 5.6%, relatively consistent with a smaller study done by Zhang et al.[16] in China also on patients with Fitzpatrick scores of three and four. This is now introduced and defined in the methods section] and in Italy by Campisi[17] noting complication rates of 5%. Another U.S. study by Kirby et al.,[18] reported hypopigmentation rates of 8% and hyperpigmentation rates as high as 22% in patients with darker skin tones when compared with patients with lighter skin tones. Surprisingly, while there was little variability in skin tones in our patient population and no statistical signficance, complication findings in our large sample of Fitzpatrick skin tones of III and IV is consistent with the literature. Further, this study provides the largest published cohort of dark-skinned patients that we have found in the literature, unique in and of itself. The Chinese study is consistent with our findings, noting that amateur tattoos, blue and black tattoos, and tattoos with low ink density are removed more readily than others by laser treatment.[16]

Complications in patients of color. We found that the occurrence of any complication during the treatment process was correlated with a decreased likelihood that a patient would complete their tattoo removal. This makes it imperative for health care providers to adequately advise patients about the complications that may occur and to ensure that the treatment settings are optimized to minimize complications.

Tattoos that were performed by a professional tattoo artist, defined as taking place in a standard tattoo parlor, were statistically more likely to be associated with complications than amateur tattoos. We hypothesize that given the rudimentary equipment that is often used "on the street" and in prisons, amateur tattoos likely do not penetrate as deeply into the skin, and perhaps do not inject as many layers of ink as a standard tattoo machine (and subsequently do not have as much ink to remove).[19] In amateur tattoo administration, the needle used is not hollowed and only functions to deposit ink, leading to less ink deposited and color variations compared with professional tattoos.[19] Additionally, prison ink materials may vary to include ash, charcoal, xerox cartridges, toothpaste, shaving cream, and Indian ink, among other things (T. Clarke, PA, oral communication, March 2022).[19] In contrast, professional tattoos are made by injecting pigment using a hollow needle with a constant vibration into the dermis which results in a uniform, high-density, and deeper ink deposition. Professional tattoo ink is made of a mixture of organometallic dye to produce a variety of colors.[20]

Prison tattoo machines can be made out of all sorts of everyday items such as CD players and electric beard trimmers by taking their very small motors and adapting them to make the needle oscillate fast enough.[19] Needles are often made from old guitar

strings by heating them over a flame until they split in half, creating a fine, sharp point. Pen springs and paper clips are also commonly used.[19] Prisoners with fresh tattoos or who are caught making tattoo machines while incarcerated can be punished with solitary confinement; prisoners often make machines to sell to other inmates, for as much as $30 each.[19] Black ink is often made from the ashes left over from burning plastic razors or Bible pages mixed with alcohol. To get colors, prisoners often use liquid India ink that family members buy from arts and crafts stores.[19]

Optimal counseling guidelines for darker-skinned patients who were formerly incarcerated or gang-involved. The variability in the materials used to create prison tattoo ink often affects tattoo appearance. This variability contributes to the challenges in advising patients about the exact number of treatments needed for tattoo completion, and final outcomes in the tattoo removal process. Further, there can be skin trauma that occurs in the tattoo application process and must be adequately documented and noted when a patient begins the tattoo removal process. This allows the health care provider to realistically counsel the patient on the final appearance of the skin after the tattoo color is removed. It ensures that all health care providers involved in the care of the patient are clear that the skin trauma occurred in the application process and not in the removal process. Careful photo documentation should be encouraged at the inception of treatment. More ink is often utilized in darker-skinned individual's tatoos so that the tattoos stand out on darker skin pigment so further treatments may be needed to remove the ink. Lastly, people with prison tattoos should be screened for all hepatitis viruses, especially hepatitis C, and HIV due to the additional health risks associated with prison tattoo application.[3–5] Chronic, underlying infections and immunosuppression can also affect the tattoo removal process in this population.

Fluence. Greater average fluence applied to a tattoo is related to increased likelihood of complication occurrence. This could be related to the fact that as a patient receives subsequent treatments on a single tattoo and it starts to fade, a higher fluence or optical energy delivered per unit area is required to see a clinical response, which is typically defined as tattoo whitening without causing significant blistering. Generally, high fluence is used in faded tattoos or when the amount of target chromophore is less while low fluence is used in tattoos with intense color or layered tattoos.[20]

Inform best tattoo removal training practices and continued improvement for this patient population to improve both care delivered and completion rates. There are multiple best practices for practitioners to employ in treating tattoos of darker-skinned clients who have been recently incarcerated or are former gang members. This patient population is reintegrating into society often with a lack of resources including stable housing, work, family connections, and a cell phone. All these factors affect continuity of medical care and thus, tattoo completion rates. Thus, it is imperative to ensure health providers are sensitive to these barriers and make extra efforts to establish therapeutic relationships with patients. These efforts should include : (1) tattoo removal pre-treatment counseling which may improve treatment adherence and patient understanding of and expectations from the process; (2) tattoo-removal clinicians may benefit from additional training on risks of the tattoo removal process unique to this patient population, as well as appropriately adjust treatment settings and the number of treatments to minimize complications; (3) as tattoo removal may be the client's first

contact with a health care provider post-incarceration or after leaving a gang, creating a positive experience may impact the clients willlingness to come back for subsequent treatments; and (4) further, because this vulnerable community has a high level of trauma and suspicion, health care providers may better serve this community of recently incarcerated and formerly gang-involved individuals with additional skills in cultural competence training[21] using shared patient-clinician decision-making,[22] and receiving training in trauma-informed care.[23] With optimal care practices and adequate health care provider training, the barriers to tattoo removal and access to care for people of color are reduced, maximizing their successful reentry into society.

Limitations and future directions. Fitzpatrick skin type ratings were performed retroactively based on photographs taken at the time of first treatment. However, the quality of images was not uniform across patients. Handheld cameras were used to capture tattoo images with variable quality. Therefore, the opportunity to perform an accurate visual Fitzpatrick rating with meaningful data to interpret was limited, as was our inter-rater reliability. We found that the large majority of the HBI patients fell in the three or four Fitzpatrick skin type range, making it markedly representative of the population that HBI serves, people of color who are largely underrepresented in the literature. Future studies will include Fitzpatrick scores entered at first treatment with standardized tool. Further study limitations include that scarring of tattoos was not consistently noted by health providers on initial tattoo intake, perhaps missing the fact that a scar was the result of the tattoo application process, not the removal process.

The overall total rate of tattoo completion in our study, whether or not complications were noted, was low, but consistent with other studies.[16] The tattoo removal process is quite extensive (often requiring more than 16 treatments) because of the extra ink needed to allow the tattoo to "show" on colored skin. Treatments should not be completed in fewer sessions due to the risk of skin damage.[24,25] Further, there is a time interval between treatments of six to eight weeks (to allow time for skin healing in between treatments). Hence, the tattoo removal process requires a tremendous time commitment and nonadherence to treatment in this vulnerable, highly mobile, and low-resourced patient population is real. This speaks to the need for additional efforts to create a therapeutic environment that practices trauma-informed care, reduces barriers to treatment, and is transparent, inclusive, and welcoming.

Studies such as ours may help support tattoo removal being done in prison. This may further support this population's access needs and make it more convenient for them to receive treatment. Future studies should consider the impact of tattoo removal specifically on the reintegration of recently incarcerated and formerly gang-involved individuals into society and the barriers they encounter, independent of their tattoos, to best help them make a successful new beginning after incarceration and/or gang involvement.

Conclusion. There is a paucity of literature on tattoo removal in people of color. This population is overrepresented among those who are recently incarcerated and former gang members, and yet they have much to benefit from tattoo removal to reintegrate into society. Because the ink composition and application process of prison tattoos is different from tattoos placed by professional artists in a tattoo parlor, there are new variables and uncertainties in the removal process. The current study examined clients

at HBI and found that those who experienced complications in the tattoo removal process (hypo- or hyper-pigmentation, scarring and keloids) were less likely to return to complete the removal process, experienced more complications with higher fluences of energy, and had more complications if they had their tattoo placed by a professional tattoo artist as opposed to an amateur artist. Further, this population had more tattoo removal complications if their tattoos were red, yellow, and green in color, and if they had a greater number of treatments on a single tattoo, or more treatments in general. With optimal care practices and adequate health care provider training, the barriers to tattoo removal and access to care for people of color are reduced, maximizing their successful reentry into society.

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References

1. Huang S, Blissett G, Pei BA, et al. A descriptive analysis of the epidemiology and motivations for laser tattoo removal in an underserved population. J Community Health. 2022 Feb;47(1):127–35. Epub 2021 Sep 4. https://doi.org/10.1007/s10900-021-01024-w PMid:34480684
2. van Dooren K, Claudio F, Kinner SA, et al. Beyond reintegration: a framework for understanding ex-prisoner health. Int J Prison Health. 2011;7(4):26–36. https://doi.org/10.1108/17449201111256880 PMid:25757710
3. Centers for Disease Control and Prevention (CDC). HIV transmission among male inmates in a state prison system—Georgia, 1992–2005. JAMA. 2006;296(2):162. https://doi.org/10.1001/jama.296.2.162
4. Poulin C, Courtemanche Y, Serhir B, et al. Tattooing in prison: a risk factor for HCV infection among inmates in the Quebec's Provincial Correctional System. Ann Epidemiol. 2018 Apr;28(4):231–5. Epub 2018 Feb 10. https://doi.org/10.1016/j.annepidem.2018.02.002 PMid:29576049
5. Weinbaum C, Lyerla R, Margolis HS. Prevention and control of infections with hepatitis viruses in correctional settings. MMWR Recomm Rep. 2003 Jan 24;52(RR-1):1–36.
6. Korman J. Removal of gang-related tattoos. West J Med. 1995;162(6):541.
7. Finch BK, Thomas K, Gibbons JR, et al. The impact of residing in a gang territory on adverse birth outcomes: evidence from Los Angeles. J Urban Health. 2021;98(2): 233–47. https://doi.org/10.1007/s11524-020-00512-z PMid:33594651 PMCid:PMC8079570
8. Boyle G. Tattoo removal. Los Angeles, CA: Homeboy Industries, 2021. Available at: https://homeboyindustries.org/services/tattoo-removal/.
9. Klein A, Rittmann I, Hiller K-A, et al. An internet-based survey on characteristics of

laser tattoo removal and associated side effects. Lasers Med Sci. 2014 Mar;29(2):729–38. Epub 2013 Aug 2.
https://doi.org/10.1007/s10103-013-1395-1
PMid:23907603

10. Bencini PL, Cazzaniga S, Tourlaki A, et al. Removal of tattoos by q-switched laser: variables influencing outcome and sequelae in a large cohort of treated patients. Arch Dermatol. 2012 Dec;148(12):1364–9.
https://doi.org/10.1001/archdermatol.2012.2946
PMid:22986584
11. Goh CL, Ho SG. Laser tattoo removal: a clinical update. J Cutan Aesthet Surg. 2015;8(1):9–15.
https://doi.org/10.4103/0974-2077.155066
PMid:25949017 PMCid:PMC4411606
12. Handley JM. Adverse events associated with nonablative cutaneous visible and infrared laser treatment. J Am Acad Dermatol. 2006;55(3):482–9.
https://doi.org/10.1016/j.jaad.2006.03.029
PMid:16908355
13. Canon G. Skin deep: former inmates struggle to build new identities in a post-prison world. 2013.
https://doi.org/10.25549/usctheses-c3-350431
14. Fitzpatrick TB. The validity and practicality of sun-reactive skin types I through VI. Arch Dermatol. 1988;124(6):869–71.
https://doi.org/10.1001/archderm.1988.01670060015008
PMid:3377516
15. Yim R, Haddock J, Needell D. Statistical learning for best practices in tattoo removal. arXiv. 2021.
https://doi.org/10.1137/21S1421325
16. Zhang M, Gong X, Lin T, et al. A retrospective analysis of the influencing factors and complications of Q-switched lasers in tattoo removal in China. J Cosmet Laser Ther. 2018;20(2):71–6.
https://doi.org/10.1080/14764172.2017.1376096
PMid:29020482
17. Campisi M. Complications of tattoos and tattoos removal: state-of-the-art in Italy. Journal of Health and Social Sciences. 2016;1(2):105–12.
18. Kirby W, Koriakos A, Desai A, et al. Undesired pigmentary alterations associated with quality-switched laser tattoo removal treatment: a retrospective study and review of the literature. Switzerland: The Dermatologist, 2010.
19. Jaafari JD. The underground art of prison tattoos. New York, NY: The Marshall Project, 2019. Available at: https://www.themarshallproject.org/2019/06/07/the-underground-art-of-prison-tattoos.
20. Kurniadi I, Tabri F, Madjid A, et al. Laser tattoo removal: fundamental principles and practical approach. Dermatol Ther. 2021;34(1):e14418.
https://doi.org/10.1111/dth.14418
PMid:33068020
21. Tulane University School of Public Health. How to improve cultural competence in health care. New Orleans, LA: Tulane University School of Public Health, 2021. Available at: https://publichealth.tulane.edu/blog/cultural-competence-in-health-care/#:~:text=Improved%20Patient%20Outcomes,correct%20misunderstandings%2C%20and%20build%20trust.

22. Barry MJ. Shared decision making: informing and involving patients to do the right thing in health care. J Ambul Care Manage. 2012;35(2):90–8.
https://doi.org/10.1097/JAC.0b013e318249482f
PMid:22415282
23. Substance Abuse and Mental Health Services Administration (SAMHSA). Trauma training for criminal justice professionals. Washington, DC: U.S. Department of Human Health Services, 2023. Available at: https://www.samhsa.gov/gains-center/trauma-training-criminal-justice-professionals#:~:text=Trauma%2Dinformed%20care%20is%20an,to%20avoid%20re%2Dtraumatizing%20individuals.
24. Sardana K, Ranjan R, Ghunawat S. Optimising laser tattoo removal. J Cutan Aesthet Surg. 2015;8(1):16–24.
https://doi.org/10.4103/0974-2077.155068
PMid:25949018 PMCid:PMC4411587
25. Hernandez L, Mohsin N, Frech FS, et al. Laser tattoo removal: laser principles and an updated guide for clinicians. Lasers Med Sci. 2022;37(6):2581–7.
https://doi.org/10.1007/s10103-022-03576-2
PMid:35604505