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Marijuana and Its Implications in Breast Reduction Surgery Outcomes and Quality of Life: A Matched Analysis

Jane N. Ewing, BS*†
Chris Amro, MD*†
Ashley Chang, BA*
Zachary Gala, MD*
Mehdi S. Lemdani, BA*
Robyn B. Broach, PhD*
John P. Fischer, MD, MPH, FACS*
Joseph M. Serletti, MD*
Saïd C. Azoury, MD*

Background: With marijuana use on the rise, its influence on surgical outcomes, particularly for breast reduction, warrants investigation. This study aims to clarify marijuana's effects on breast reduction surgery outcomes, given its limited research focus despite potential perioperative implications.

Methods: A retrospective review was conducted from 2016 to 2022 of patients with/without marijuana use undergoing breast reduction. Propensity score-matching considered age, body mass index, ptosis, and breast tissue mass. Patient demographics, clinical attributes, and postoperative details were analyzed. Quality-of-life (QoL) changes were gauged using pre- and postoperative BREAST-Q.

Results: Of 415 patients who underwent breast reduction, 140 patients documented marijuana use. After propensity matching, a total of 108 patients (54 marijuana users versus 54 nonusers) were analyzed. The average age was 39 years ± 12 and body mass index 30.1 kg/m^2 ± 5.3. There were no differences between the 2 groups in comorbidities, breast symmetry, excision patterns, pedicle use, or drain count ($P > 0.05$). Furthermore, surgical outcomes including surgical site occurrences, scarring, pain levels, hypersensitivity, or sensation loss were comparable between the groups ($P > 0.05$). There were also no differences in number of readmissions, reoperations, or emergency department visits ($P > 0.05$). Both groups showed enhanced postoperative QoL, regardless of marijuana usage.

Conclusions: This study indicates that marijuana use does not significantly impact breast reduction surgery outcomes. Comparable surgical results and postoperative QoL improvements were observed in both marijuana users and nonusers. This study provides surgeons with the knowledge to offer more informed patient counseling regarding the implications of marijuana use in relation to breast reduction procedures. *(Plast Reconstr Surg Glob Open 2024; 12:e6273; doi: 10.1097/GOX.0000000000006273; Published online 5 November 2024.)*

INTRODUCTION

Within the last couple of decades, the use of marijuana has drastically increased by virtue of the expanded legalization of marijuana in the United States, becoming the most commonly used drug. More than half of the states in the United States have legalized marijuana, and in 2019, the Center for Disease Control and Prevention reported a prevalence of 18% American users.[1] This changing landscape warrants an examination of patients using marijuana before surgery.

The perioperative use of cannabis, either for medical or recreational purposes, and its effect on postoperative outcomes remain an enigma. Several studies report on increased perioperative risk of morbidity and mortality,[2] myocardial infarction,[3] postoperative nausea and vomiting,[4] higher clinical pain, poorer quality of life (QoL), and higher opioid use.[5] Although there is evidence suggesting that marijuana use can have implications in the perioperative setting for various surgical procedures, specific research on its effects on breast reduction outcomes

*From the *Division of Plastic Surgery, Department of Surgery, University of Pennsylvania, Philadelphia, Pa.; and †Hansjörg Wyss Department of Plastic Surgery, NYU Langone, New York, N.Y.*

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Ewing and Dr. Amro contributed equally to this work.

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is limited. Given the increasing prevalence of marijuana use, understanding its impact on surgical procedures, especially those as sensitive as breast reduction, becomes imperative.

This study reveals the impact of marijuana consumption on breast reduction procedures. Our study reports six years of data from our single center experience, conducting an analysis on the postoperative outcomes and QoL for breast reduction patients with and without history of marijuana use. To our knowledge, this is the first study to perform a matched pair analysis based on age, body mass index (BMI), ptosis, and breast tissue mass removed among patients who had a history of marijuana use and patients without history of marijuana use.

Takeaways

Question: What is the impact of marijuana on breast reduction surgery outcomes?

Findings: After propensity matching, a total of 108 patients (54 marijuana users versus 54 nonusers) were analyzed. There were no significant differences between the 2 groups in operative details or surgical outcomes. Both groups showed enhanced postoperative quality of life, regardless of marijuana usage.

Meaning: Marijuana consumption does not markedly affect the outcomes of breast reduction surgery. Improvement in postoperative quality of life was noted in breast reduction patients regardless of marijuana use.

METHODS

Study Design and Population

A retrospective review of patients who underwent breast reduction surgery performed by plastic and reconstructive surgeons within the University of Pennsylvania Health system between January 1, 2016, and June 30, 2022 was performed. Adult female (older than 18 years) undergoing breast reduction with the Wise pattern technique were included in the study. Patients with oncoplastic resection or concurrent procedures (ie, additional, extensive mastopexy beyond the Wise pattern technique) were excluded. This study was approved by the institutional review board (protocol no. 855109) and adhered to all HIPAA (Health Insurance Portability and Accountability Act of 1996) requirements.

Data Collection and Outcomes

This retrospective cohort study was limited to existing data from the electronic medical records stored securely on REDCap.[6] Demographic and clinical variables included age, BMI, race/ethnicity, smoking status, surgical history, relevant health conditions (eg, gigantomastia, immunosuppression, diabetes, peripheral vascular disease, presence of bra notching, presence of inframammary rash or skin discoloration), and insurance status. Gigantomastia was defined previously as either a sternal notch-to-nipple distance of 40 cm or more or 1500 g or more of tissue removed from a single breast during surgery.[7]

Operative variables consist of breast symmetry, grade of ptosis, estimated tissue removal, preoperative breast measurements (nipple to notch, base width, nipple to inframammary fold, nipple to midline, and nipple diameter), pedicle technique, creation of nipple diameter, utilization of skin glue, number of drains placed during reduction, perioperative deep vein thrombosis prophylaxis type, and postoperative breast measurements (nipple to notch, base width, nipple to inframammary fold, nipple to midline, and nipple diameter).

Postoperative complications include surgical site occurrences such as surgical site infection, cellulitis, hematoma, seroma, dehiscence, delayed wound healing, T-junction breakdown, and necrosis (eg, nipple-areolar complex and fat). (**See table, Supplemental Digital Content 1,** which displays postoperative complication definitions, **http://links.lww.com/PRSGO/D598**.) Revisions and readmissions were additionally collected. Patient-reported outcomes (PROs) were assessed using the breast reduction module of the BREAST-Q, which is a validated tool that examines a patient's physical, sexual, and psychosocial well-being, as well as their satisfaction with breasts. Raw scores were converted to Rasch scores, ranging from worst (0) to best (100), where higher scores indicate a better outcome.[8] BREAST-Q surveys were administered before and after breast reduction surgery. Postoperative BREAST-Qs were administered between 2 weeks and 6 months after surgery at every visit, and the most recent postoperative BREAST-Q was recorded.

Statistical Analysis

To control for confounding variables, a propensity score-matching analysis was performed comparing breast reduction patients who had no history of marijuana use with those who had a history of marijuana use.[9,10] A 1:1 optimal matching method using nearest neighbor matching was used to account for the following covariates: age, BMI, ptosis, and breast tissue mass. Balance between the 2 cohorts was achieved, with all standardized mean differences below 0.2. Appropriate statistical tests, such as χ^2 and Fisher exact tests, were used for dichotomous variables. Continuous data were analyzed using Mann-Whitney U and *t* tests, as appropriate. Wilcoxon signed rank tests were used to compare improvement of BREAST-Q for each group. All statistical analyses were conducted using the R programming language Version 4.2 (R Core Team, Vienna, Austria).[11] A *P* value of less than 0.05 was considered statistically significant.

RESULTS

There were 953 patients who underwent breast reduction surgery. A total of 415 of the patients met inclusion criteria, of whom 140 patients had a documented history of marijuana use. After propensity score matching, 108 patients (54 marijuana users versus 54 nonusers) were analyzed.

Patients' baseline demographics can be observed in Table 1. The average age was 39 years ± 12. Most women

Table 1. Baseline Demographic Characteristics of the No Marijuana Use and Marijuana Use Cohorts

	No Marijuana Use (N = 54)	Marijuana Use (N = 54)	Total (N = 108)	*P*
Age, mean (SD)	39.3 (13.8)	38.90 (12.2)	39.12 (12.9)	0.94
Race				0.55
White	26 (48.1%)	20 (37.0%)	46 (42.6%)	
Black	21 (38.9%)	30 (55.6%)	51 (47.2%)	
Other	6 (11.1%)	3 (5.6%)	9 (8.3%)	
Body mass index (kg/m^2), median [Q1, Q3]	29.9 (25.6, 34.3)	29.6 (27.6, 31.8)	29.8 (26.5, 33.4)	0.73
Smoking history				0.54
Current	2 (3.7%)	5 (9.3%)	7 (6.5%)	
Former	16 (29.6%)	14 (25.9%)	30 (27.8%)	
Never	36 (66.7%)	35 (64.8%)	71 (65.7%)	
Symmetry				0.53
L > R	25 (46.3%)	19 (35.2%)	44 (40.7%)	
R > L	18 (33.3%)	20 (37.0%)	38 (35.2%)	
No noticeable difference	4 (7.4%)	8 (14.8%)	12 (11.1%)	
Ptosis				0.84
Grade 2	7 (13.0%)	9 (16.7%)	16 (14.8%)	
Grade 3	45 (83.3%)	44 (81.5%)	89 (82.4%)	
Insurance				0.43
Coverage-approved	45 (83.3%)	48 (90.6%)	93 (86.9%)	
Coverage-denied	3 (5.6%)	2 (3.8%)	5 (4.7%)	
Bra notching	45 (83.3%)	44 (81.5%)	89 (82.4%)	1.00
Rash	22 (40.7%)	28 (51.9%)	50 (46.3%)	0.50
Immunosuppression	1 (1.9%)	3 (5.6%)	4 (3.7%)	0.62
Diabetes	1 (1.9%)	3 (5.6%)	4 (3.7%)	0.62
Peripheral vascular disease	2 (3.7%)	0	2 (1.9%)	0.50
Previous weight loss surgery	2 (3.7%)	2 (3.7%)	4 (3.7%)	1.00
Gigantomastia	6 (11.3%)	5 (9.3%)	11 (10.3%)	0.76

L, left; Q, quartile; R, right.

were Black (47.2%) with a median BMI of 29.8 kg/m^2 [interquartile range 26.5–33.4] and did not smoke (93.5%). A great number of women had breast asymmetry (L > R 40.7%, R > L 35.2%) and grade 3 ptosis (82.4%). Most breast reduction procedures were covered by insurance (86.9%), as many met criteria for approval. The presence of bra notching occurred in 82.4% of patients, and the presence of inframammary rash occurred in 46.3% of patients. No significant differences in patient demographics and comorbidities were observed between the two cohorts.

All breast reductions were performed using a Wise pattern technique, with 36.4% using an inferior pedicle and 60.7% using a superomedial pedicle. Median tissue removed was 803 g for the left breast ($P = 0.52$) and 786 g on the right breast ($P = 0.31$). Breast measurements (nipple to notch, base width, nipple to inframammary fold, nipple to midline, and nipple diameter) and number of drains were comparable between the 2 groups and can be seen in Supplemental Digital Content 2. (**See table, Supplemental Digital Content 2,** which displays the clinical characteristics and operative details of the no marijuana and marijuana cohorts, **http://links.lww.com/PRSGO/D599**.) Closing technique varied between staplers (63%) and sutures (36.1%) ($P = 0.84$), and only 73.6% used skin glue ($P = 0.12$).

Postoperative outcomes are summarized in Table 2. There were no statistically significant differences between marijuana users and nonusers in surgical site infection, cellulitis, seroma, hematoma, dehiscence, nipple-areolar complex necrosis, fat necrosis, t-point breakdown, or delayed healing ($P > 0.05$). Other surgical outcomes including scarring, pain levels, hypersensitivity, and sensation loss were not statistically different ($P > 0.05$). There were no differences in the number of readmissions, reoperations, or emergency department visits.

Of the total, 79.6% and 81.5% preoperative BREAST-Q surveys were completed for the marijuana and no marijuana use cohorts, respectively. Within both groups, 48.1% had completed postoperative BREAST-Q surveys. The QoL scores were comparable between the marijuana cohort and no marijuana cohort among the four BREAST-Q domains. Patients reported improved scores across all BREAST-Q domains in both cohorts, with scores being consistently high among the satisfaction domain (Table 3).

DISCUSSION

The increasing prevalence of perioperative use of marijuana underscores the critical need to understand its effect on postoperative outcomes and QoL. In this matched cohort study of patients seeking breast reduction surgery, we found no significant differences in postoperative complications between those who used marijuana and those who did not, suggesting that marijuana consumption does not markedly affect the outcomes of breast reduction surgery. Critically, the results demonstrate that

Table 2. Postoperative Outcomes of the No Marijuana Use and Marijuana Use Cohorts

	No Marijuana Use (N = 54)	Marijuana Use (N = 54)	Total (N = 108)	*P*
Patients with SSOs	29 (53.7%)	27 (50.0%)	56 (51.9%)	0.85
SSI	1 (1.9%)	0	1 (0.9%)	1.00
Cellulitis	1 (1.9%)	4 (7.4%)	5 (4.6%)	0.21
Seroma	0	2 (3.7%)	2 (1.9%)	0.24
Hematoma	3 (5.7%)	4 (7.4%)	7 (6.5%)	1.00
Dehiscence	1 (1.9%)	4 (7.4%)	5 (4.6%)	0.21
Delayed healing	12 (22.2%)	11 (20.4%)	23 (21.3%)	1.00
T-point breakdown	14 (25.9%)	13 (24.1%)	27 (25.0%)	1.00
NAC necrosis	0	1 (1.9%)	1 (0.9%)	0.50
Fat necrosis	2 (3.8%)	2 (3.7%)	4 (3.7%)	1.00
Wide scar	4 (7.5%)	7 (13.0%)	11 (10.3%)	0.28
Keloid	1 (1.9%)	1 (1.9%)	2 (1.9%)	1.00
Pain	0	1 (1.9%)	1 (0.9%)	1.00
Numbness	0	3 (5.6%)	3 (2.8%)	0.33
Readmitted	0	3 (5.6%)	3 (2.8%)	0.24
Reoperation	4 (7.4%)	6 (11.1%)	10 (9.3%)	0.74
ED visits	3 (5.6%)	7 (13.0%)	10 (9.3%)	0.32

ED, emergency department; NAC, nipple-areolar complex; SSI, surgical site infection; SSOs, surgical site occurrences.

Table 3. Quality-of life Assessment of the No Marijuana Use and Marijuana Use Cohorts

	Marijuana Use			No Marijuana Use		
BREAST-Q Domain	**Time of Administration**	**Mean ± SD**	***P***	**Time of Administration**	**Mean ± SD**	***P***
Physical	Preoperative (N = 43)	36.2 ± 18.7	<0.001	Preoperative (N = 44)	38.6 ± 13.5	<0.001
	Postoperative (N = 26)	74.7 ± 22.9		Postoperative (N = 26)	78.7 ± 22.5	
Sexual	Preoperative (N = 43)	30.5 ± 23.8	<0.001	Preoperative (N = 44)	30 ± 22.1	<0.001
	Postoperative (N = 26)	76.7 ± 27.1		Postoperative (N = 26)	56.6 ± 34.8	
Psychosocial	Preoperative (N = 43)	28.8 ± 16.8	<0.001	Preoperative (N = 44)	37.8 ± 19.1	<0.001
	Postoperative (N = 26)	82.7 ± 16.9		Postoperative (N = 26)	85.4 ± 18.3	
Satisfaction	Preoperative (N = 43)	18.5 ± 14.2	<0.001	Preoperative (N = 44)	22.1 ± 16.5	<0.001
	Postoperative (N = 26)	82 ± 22.4		Postoperative (N = 26)	88.7 ± 13.1	

QoL was improved across patients with and without perioperative marijuana use.

Several surgical reconstructive studies had similar findings to our study, revealing no significant association between marijuana use and surgical outcomes.[12,13] For instance, studies have revealed no difference in postoperative complications between marijuana users and nonusers in bariatric surgery[14] and spine surgery.[15] Yoon et al[16] found that patients undergoing mandibular facial fracture surgery with a history of cannabis use had no effect on the risk of developing a postoperative complication. In contrast, another study on 327 patients with history of marijuana use undergoing implant-based breast reconstruction had a higher risk of developing a postoperative complication.[12] These differences in findings may be due to the different patient populations, given that the previous literature primarily examines the effects on outcomes after various reconstructive plastic surgery procedures. The current study provides specific results of breast reduction surgery, which is one of the most commonly performed surgical procedures in plastic surgery.

Among the surgical outcomes examined, our study revealed no significant difference in pain when comparing both cohorts—a topic that remains widely controversial and deserves further discussion. Although many studies have demonstrated efficacy of marijuana in chronic pain, they seem to be ineffective in acute postoperative pain.[17] In a study evaluating 3793 patients undergoing major orthopedic surgery, cannabis was associated with higher levels of pain in the early postoperative period.[18] Despite this study and additional studies demonstrating higher reports of pain postoperatively in patients who use cannabis,[5,19] it was found that patients generally believe marijuana may be effective in acute postoperative pain management. Regardless of the belief of the public, our study's finding expands on the current literature, indicating that marijuana use has no significant association with postoperative pain in patients undergoing breast reduction surgery.

At our institution, surgeons generally ask their patients to quit smoking before operating, confirming with nicotine urine screening tests. This request has increasingly become the standard of care in the medical field for elective or cosmetic surgery due to all of the reported complications associated with smoking,[20] thus posing a challenge for researchers to analyze concomitant effects of marijuana and smoking. This barrier explains the low sample size of tobacco users in our cohort (n = 7). In an attempt to understand the role of concomitant tobacco use, we revisited the literature to discuss smoking as a potential effect modifier. Yoon et al found that patients who used both tobacco and marijuana were more likely to develop a surgical site infection, facial nonunion, or facial abscess,

or undergo debridement than those who only used tobacco. Interestingly, concurrent tobacco use has variable findings in the literature, and it is unclear why. For example, in the study examining cannabis use in implant-based reconstruction by Garoosi et al,[21] they found higher risk of developing postoperative complications in patients using both tobacco and cannabis. These studies suggest that cannabis use potentiates the effects of tobacco. In our study, our findings focus on the effects of marijuana alone, with smoking as an unlikely effect modifier.

When exploring our descriptive data on the QoL assessments, we observed overall enhanced postoperative physical, sexual, and psychosocial well-being, and satisfaction scores in both cohorts. In general, those who used marijuana had lower scores than those without marijuana use. Our finding on enhanced postoperative QoL in both groups is consistent with the literature. In a 2021 study on postdischarge opioid consumption and PROs of patients across 69 hospitals who underwent 16 different types of procedures, patients who used marijuana reported lower satisfaction, QoL, and no regret after surgery.[19] Albelo et al[22] had similar results indicating that marijuana use correlated with worse pain relief, mental health scores, and satisfaction after orthopedic surgery. However, that study had concluded that marijuana was not a good predictor for postoperative satisfaction once controlling for confounding variables.[22] Future larger studies investigating marijuana use in patients undergoing breast reduction surgery and its impact on PROs are warranted.

As cannabis becomes more accessible, subsequently due to the changing legal landscape of medicinal and recreational cannabis use, the discussions and research examining the role of cannabis will persist in the medical and surgical arena. If the legalization of marijuana expands, this may not only increase use but also may reduce the current stigma that accompanies its use, which will in turn increase patients' disclosure of marijuana use.[23] We hope this study provides surgeons with the knowledge to offer more informed patient counseling regarding the implications of marijuana use in relation to breast reduction procedures.

There are limitations to consider in this study. First, we were unable to obtain the amount and frequency of cannabis use. However, we found that most literature was lacking in providing relevant granular information on cannabis, such as the composition, formulation, timing, route, and presence of contamination. The reason for this is most likely due to the difficulty in quantifying the amount of marijuana consumed, as it is not always obtained in a standardized unit of measure. Second, our study had a low sample size, potentially underpowering our study to detect a true significant difference. However, we ultimately chose the statistical method that had greater improvements to the validity of the study.[10,24–26] We acknowledge that the numbers reported in this study may be an underestimate given the federal illegal status of recreational marijuana in the state of Pennsylvania, in which this study took place. However, our study had comparable rates to previous studies, as mentioned earlier in this article. Furthermore, this study highlights the need to advocate for providers to foster a safer space for patients to honestly disclose their drug use, enabling patients to receive the best care possible. This study emphasizes the need for a larger prospective study and should additionally investigate drug testing in the "nonuser" group to determine rates of nonreporting, as well as other data variables (ie, quantity and frequency of marijuana use) that would help elucidate the effect of marijuana use in patients undergoing breast reduction surgery.

CONCLUSIONS

The findings of this study suggest that marijuana consumption does not markedly affect the outcomes of breast reduction surgery. Those who reported marijuana use and those who did not both demonstrated no differences in surgical outcomes, and a notable improvement in postoperative QoL was evident. This study provides surgeons with knowledge to help counsel patients regarding the implications of marijuana use in a cosmetic procedure.

Saïd C. Azoury, MD
University of Pennsylvania
Perelman Center for Advanced Medicine
3400 Civic Center Blvd, 14th Floor South Building
Philadelphia, PA 19104
E-mail: Said.azoury@pennmedicine.upenn.edu

DISCLOSURES

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