



Full length article

Blunts versus joints: Cannabis use characteristics and consequences among treatment-seeking adults

LaTrice Montgomery^{a,*}, Erin A. McClure^b, Rachel L. Tomko^b, Susan C. Sonne^b,
Theresa Winhusen^a, Garth E. Terry^c, Jason T. Grossman^d, Kevin M. Gray^b

^a Department of Psychiatry and Behavioral Neuroscience, University of Cincinnati College of Medicine, 3131 Harvey Avenue, Suite 104, Cincinnati, OH, 45229, USA

^b Department of Psychiatry and Behavioral Sciences, Medical University of South Carolina, 67 President Street, MSC861, Charleston, SC, 29425, USA

^c Department of Psychiatry and Behavioral Sciences, University of Washington School of Medicine, 1660 S Columbian Way, Seattle, WA, 98108, USA

^d Department of Psychiatry and Biobehavioral Sciences, University of California, Los Angeles; Integrated Substance Abuse Programs, 11075 Santa Monica Blvd Ste 200, Los Angeles, CA 90025, USA

ARTICLE INFO

Keywords:

Blunts
Joints
Cannabis dependence
Withdrawal
Adults

ABSTRACT

Background: Despite the high prevalence of blunt smoking among cannabis users, very few studies examine the clinical profile of blunt smokers relative to those using more common methods of cannabis use, such as joints. **Methods:** The current study uses baseline data from the ACCENT (Achieving Cannabis Cessation-Evaluating N-acetylcysteine Treatment) study, a multi-site randomized pharmacotherapy clinical trial within the National Drug Abuse Treatment Clinical Trials Network, to predict the association between blunt and joint use frequency and cannabis use characteristics (e.g., grams of cannabis used) and consequences (e.g., withdrawal) among past-month cannabis users ($N = 377$) who were screened for study participation.

Results: After controlling for race, age, gender, other forms of cannabis use (including joint use) and nicotine dependence, multivariable linear regression models indicated that the number of days of blunt use in the past month was a significant predictor of the average amount of cannabis per using day ($t = 3.04, p < .01$), the estimated average cost of cannabis ($t = 2.28, p < .05$) and Cannabis Withdrawal Scale scores ($t = 1.94, p < .05$). Frequency of joint use did not significantly predict any of the cannabis use characteristics or consequences. **Conclusions:** Blunt smokers may present to treatment with greater amounts of cannabis smoked and more intense withdrawal symptoms, which may adversely impact their likelihood of successful abstinence. Cannabis-dependent blunt smokers may be more likely to benefit from treatment that targets physiological and mood-related withdrawal symptoms.

1. Background

Despite the modest increase of cannabis use and slight decrease in the prevalence of Cannabis Use Disorders (CUD) found among adults in the United States from 2002 to 2013 (Gruzca et al., 2016), recent studies have indicated an increase in cannabis-involved admissions to addiction treatment facilities and emergency departments over the same period of time (Johnston et al., 2012; Substance Abuse and Mental Health Services Administration, 2013; Zhu and Wu, 2016). For instance, Shen et al. (2018) found that cannabis-associated emergency department visits per 100,000 emergency department discharges increased monotonically (annually by 7%) from 2006 to 2014. Despite the increasing prevalence of problematic cannabis use amongst the

general population and individuals entering treatment, demographic and/or clinical differences among individuals with CUD are still poorly understood. For instance, although joints are the most commonly used method of cannabis administration (Hindocha et al., 2016), other methods are becoming increasingly popular, such as the use of bowls/pipes (49.5%) and bongs, water pipes or hookah (21.7%) among current cannabis users (Schauer et al., 2017). It remains unclear if and how these methods (e.g., blunts, dabbing) might influence cannabis use characteristics (e.g., amount of cannabis used) and consequences of use (e.g., cannabis withdrawal) among individuals with CUD. Existing studies focus on traditional joint smokers or ignore the method of administration altogether (Allsop et al., 2012; Batalia et al., 2013).

One relatively understudied method of administration is blunt

* Corresponding author at: Department of Psychiatry and Behavioral Neuroscience, Addiction Sciences Division, University of Cincinnati College of Medicine, 3131 Harvey Avenue, Suite 104, Cincinnati, Ohio, 45229, USA.

E-mail address: latrice.montgomery@uc.edu (L. Montgomery).

<https://doi.org/10.1016/j.drugalcdep.2019.01.041>

Received 22 August 2018; Received in revised form 3 January 2019; Accepted 27 January 2019

Available online 14 March 2019

0376-8716/© 2019 Elsevier B.V. All rights reserved.

smoking. Among past-year cannabis users, 66% reported smoking a blunt in the past year and 40% reported past month blunt use (Fairman, 2015). Blunts are hollowed out little cigars or cigarillos (LCCs) that are filled with cannabis. In contrast to blunts, joints consist of cannabis rolled into lighter, partially translucent paper that does not contain tobacco. Despite the popularity of joint smoking among cannabis users (Hindocha et al., 2016), studies have shown a growing trend in blunt smoking (Fairman, 2015; Golub et al., 2005; Schauer et al., 2017), especially among young adults. Blunt use has been associated with an increased likelihood of cannabis dependence (Ream et al., 2008; Timberlake, 2009), as well as myriad other risk factors (e.g., perceptions of decreased risk) compared to other methods of cannabis administration (Schauer et al., 2017). Further, blunt users are also more likely than other cannabis users to be nicotine dependent, likely due to residual tobacco left inside of the blunt or nicotine exposure via the LCC wraps used to make blunts (Peters et al., 2016). Despite the increased prevalence of blunt use and health risks associated with their use, very few studies have compared the effects of blunts with that of joints. Given that joints are the most common method of cannabis administration (Hindocha et al., 2016; Schauer et al., 2017) and are often included as a measure of cannabis use in studies (e.g., number of joints smoked in the past month; Gates et al., 2016), it is important to determine if there are meaningful clinical differences between blunts and joints that might inform the direction of future treatments and research.

To the authors' knowledge, while several studies have compared blunt use to non-blunt cannabis use (e.g., Cohn et al., 2016), only three have directly compared blunts and joints (Cooper and Haney, 2009; Mariani et al., 2011; Ream et al., 2006). In 2006, Ream and colleagues presented quantitative findings from a mixed-methods ethnographic and sample-survey investigation of young adult cannabis users in New York City. The study found that blunt users, compared to joint users, shared distinctive demographic (e.g., male, African American, unemployed, identification with the Hip Hop culture), legal (e.g., more likely to have an arrest record), social (e.g., have fewer friends who use cannabis) and cannabis use (e.g., initiated cannabis use at an earlier age) patterns. Findings from this study suggest that blunt use is associated with a distinctive subculture that differs from that of traditional joint use. In 2009, Cooper and Haney conducted an experimental study to compare the subjective, physiological and pharmacokinetic effects of joint and blunt smoking. Adults who smoked joints evidenced greater increases in plasma Δ^9 -tetrahydrocannabinol (THC) and reported greater subjective ratings of cannabis intoxication, strength and quality than those who smoked blunts, particularly among women. However, although blunt smoking produced lower levels of plasma THC, blunts produced equivalent increases in heart rate and higher carbon monoxide levels than joints. The most recent study (Mariani et al., 2011) compared the quantity and estimated dollar value of cannabis using a surrogate weight estimation procedure among blunt, joint and pipe smokers participating in two pharmacotherapy trials for cannabis dependence. Similar to Ream et al. (2006), researchers found that blunt users were more likely to be African American or Hispanic, while joint (and pipe) users were more likely to be White. Further, they found that blunts contained 1.5 times the amount of cannabis than joints and 2.5 times that of pipes. In addition to demonstrating the feasibility of the surrogate estimation method, this study also provides insight into how blunts differ from both joints and pipes.

Several gaps exist in the extant literature on blunt and joint use. First, the small number of studies ($k = 3$) drawn from regional areas (e.g., New York City; Ream et al., 2006) comparing blunt smokers to joint smokers limits our ability to draw strong conclusions about the effects of blunts relative to joints. Second, many studies compare blunt use with non-blunt cannabis use, rather than joint use in particular (Cohn et al., 2016; Fairman, 2015; Moolchan et al., 2005; Montgomery and Bagot, 2016; Timberlake, 2009). Several studies utilize data from the National Survey on Drug Use and Health which assesses blunt use and overall cannabis use, but does not examine other methods of

cannabis administration (e.g., joints, bongs). Therefore, it is difficult to disentangle the specific effects of joint use compared to blunt use. Third, although the cannabis withdrawal syndrome and craving for cannabis (and other substances) are now formally recognized in the Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition (DSM-5), very few studies investigate how withdrawal and craving might differ by method of cannabis administration. Studies have demonstrated a strong link between cannabis withdrawal and relapse (Cornelius et al., 2008; Davis et al., 2016), which could, in turn, influence treatment response. Therefore, it is important to determine if different methods of cannabis administration are associated with heightened withdrawal symptoms and cravings.

The current study was designed to address these gaps by assessing the association between blunt and joint use frequency and characteristics (e.g., amount of cannabis smoked) and consequences (e.g., withdrawal) among treatment-seeking cannabis users participating in the screening procedures of the ACCENT trial. Based on existing literature displaying worse outcomes among blunt users relative to non-blunt cannabis users (Schauer et al., 2017), we hypothesize that the frequency of blunt use would significantly predict cannabis use characteristics and consequences. Given that frequent users are more likely to use more than one form of cannabis (Knapp et al., 2018; Krauss et al., 2017), this study will also assess and control for other methods of cannabis administration to tease apart the specific effects of blunt and joint use.

2. Methods

2.1. Participants

The ACCENT study was a 12-week, double-blind, placebo controlled, multi-site trial of *N*-acetylcysteine (NAC) combined with abstinence-based contingency management and brief medication management for cannabis dependence treatment. Participants ($N = 302$ randomized) were treatment-seeking adults (ages 18–50) with DSM-IV cannabis dependence and were randomized to receive orally administered NAC or matched placebo at a dose of 1200 mg twice daily for 12 weeks. All participants received weekly medication management and twice weekly contingency management for biochemically verified cannabis abstinence. A full description of the study and primary findings have been published elsewhere (McClure et al., 2014; Gray et al., 2017). For the purposes of the current project, we examined screening/baseline data from the 377 consented participants who completed the initial screening assessments in the ACCENT study and provided data on their past month blunt and joint use.

Participants were recruited from six National Institute on Drug Abuse (NIDA) Clinical Trials Network (CTN) settings in South Carolina, Connecticut, Kentucky, California, Texas and Oregon. The inclusion/exclusion criteria are fully described in a previous publication (McClure et al., 2014). Briefly, participants were included if they: (1) were between the ages of 18–50, (2) able to provide informed consent, (3) met DSM-IV criteria for cannabis dependence, (4) were treatment-seeking (for cannabis), and (5) had a positive urine toxicology result for THC at screening. Exclusion criteria included: (1) currently enrolled in treatment for cannabis dependence, (2) use of synthetic cannabinoids, (3) other substance dependence (except for nicotine), (4) positive urine toxicology other than cannabis at randomization (with the exception of amphetamines if they had a prescription), and (5) on buprenorphine or methadone maintenance.

2.2. Measures

2.2.1. Demographic information/baseline tobacco smoking

Self-reported data regarding age, race (White, African American, Asian, American Indian or Alaska Native, Native Hawaiian or Pacific Islander, Multiracial, Other, or Unknown), gender (male or female),

employment status (Working now, Only temporarily laid off [sick leave], looking for work [unemployed], retired, disabled permanently or temporary, keeping house, student or other) and marital status (Married, Widowed, Divorced, Separated, Never Married, Living with Partner, Refused, Don't Know) were collected at baseline via a demographic form and used in the current study. The Fagerstrom Test for Nicotine Dependence (FTND) was administered at baseline to assess nicotine dependence related to cigarette smoking (Heatherton et al., 1991). The FTND is a six item measure with yes/no items (e.g., smoking while extremely ill) scored from 0 to 1 and multiple-choice items (e.g., most difficult cigarette to give up) scored from 0 to 3, yielding a total score of 0–10. Higher scores indicate a more intense level of physical dependence to nicotine.

2.2.2. Cannabis use characteristics

The Timeline Followback (TLFB) procedure (Sobell et al., 1988) was used to assess the frequency and quantity of past 30-day cannabis use prior to study enrollment. Participants reported whether they used cannabis and the number of days they used specific methods of cannabis administration (i.e., joints, blunts, pipes/bowls, bongs, ingestion, vaporizers, and other) in the past month. Due to diversity in the potency and methods of administration in cannabis use, participants were also asked to quantify their cannabis use by weighing out amounts (measured in grams) of a surrogate substance (i.e., dried motherwort) and reporting on the amount's potency through dollar value estimates. This quantification procedure has been shown to successfully augment cannabis use data from the TLFB procedure (Mariani et al., 2011).

2.2.3. Cannabis use consequences

The 19-item Marijuana Problem Scale (MPS; Stephens et al., 2000) is a self-report measure assessing problems related to cannabis use in the past month, such as medical problems and financial difficulties. Participants were asked to rate each item on a 3 point Likert scale (0 = no problem, 1 = minor problem and 2 = serious problem). The MPS score was calculated by adding the number of items that were reported as either a 1 or 2, for a total possible score of 19. Higher scores indicate more serious problems with cannabis use. The Marijuana Craving Questionnaire (MCQ; Heishman et al., 2009, 2001) is a 12-item Likert-based self-assessment of cannabis craving. Sample items include “I would feel more in control of things right now if I could smoke marijuana” and “I need to smoke marijuana now.” Participants were asked to rank each item on a Likert-scale ranging from strongly disagree (1) to strongly agree (7). The MCQ score was calculated by adding all of the items together. The MCQ also includes subscales for compulsivity (inability to control cannabis use), emotionality (use of cannabis in anticipation of relief from withdrawal or negative mood), expectancy (anticipation of positive outcomes from smoking cannabis) and purposefulness (intention and planning to use cannabis for positive outcomes) (Heishman et al., 2009). Higher scores indicate higher craving levels. The 19-item Cannabis Withdrawal Scale (CWS; Allsop et al., 2011) is a valid assessment of cannabis withdrawal symptoms experienced in the past 24 h, such as angry outbursts and trouble sleeping at night. Participants were asked to rate each statement on a scale from 0 (not at all) to 10 (extremely). Participants were also asked to rate the negative impact of each item on daily activities using the same scale. The CWS includes two subscales, (1) withdrawal intensity and (2) negative impact of withdrawal symptoms, with a maximum withdrawal score of 190 for each subscale. The total score for the CWS represents the sum of the two subscales.

2.3. Data analysis plan

The current study was a cross-sectional analysis of baseline data from a multi-site clinical trial of treatment-seeking cannabis dependent adults. Descriptive statistics were conducted to assess baseline demographic characteristics (i.e., age, gender, race, employment status and

marital status), cannabis and tobacco smoking history (i.e., number of days of blunt, joint, pipe/bong, bowl, injection, vaporizer and other forms of cannabis use in the past month, FTND score) and cannabis use characteristics (i.e., amount of cannabis per using day, amount spent on cannabis per using day) and consequences (i.e., MPS, MCQ and CWS scores). Pearson correlations for continuous variables and F tests for categorical variables were used to examine the association between demographic and smoking history and cannabis use characteristics and consequences. Demographic and smoking history characteristics significantly associated with any of the cannabis use characteristics and consequences were included in multivariate models. Multivariable linear regression analyses were conducted to predict the association between the number of days of blunt use in the past 30 days, number of days of joint use in the past 30 days, relevant covariates and cannabis use characteristics and consequences. Post-hoc analyses of specific scale items (i.e., CWS) were conducted on scales that displayed a significant association between days of blunt and/or joint use and the overall scale score. The p -value was considered statistically significant at the 0.05 level. The Statistical Package for the Social Sciences (SPSS) Version 24 was used to conduct all analyses.

3. Results

3.1. Sample characteristics

The sample included in the current analysis ($N = 377$) was mostly male (72.4%) with an average age of 30.2 ($SD = 8.9$). The racial/ethnic composition of the sample was 58.7% White, 27.3% African American, 1.0% Asian, 0.7% American Indian or Alaska Native, 0.3% Native Hawaiian or Pacific Islander, 6.3% Multiracial, 4.7% Other and 1% unknown or participant chose not to answer. Approximately 22% of the sample was Hispanic. Most participants reported having a high school diploma or GED/equivalent (32.2%) or some college (34.7%). Approximately half of the sample was currently employed (49.7%). The majority of adults in this sample had never been married (64.1%).

Overall, participants reported using cannabis in any form for an average of 26.01 ($SD = 6.01$) days in the past month. Participants reported an average of 11.14 ($SD = 12.35$) days of blunt use and 6.05 ($SD = 9.82$) days of joint use in the past month. Participants also reported an average of 8.73 ($SD = 11.09$) and 3.43 ($SD = 7.86$) days of pipe/bowl and bong use, respectively. Other methods of cannabis administration (i.e., injections, vaporizers, spliffs, others) were used, on average, less than one day in the past month. The average amount of cannabis per using day was 2.33 g ($SD = 1.24$), while the estimated average cost for cannabis per using day was \$8.65 ($SD = 5.79$). The average scores of the CWS, MC, and MPS scales were 80.33 ($SD = 68.22$), 47.17 ($SD = 16.04$), and 6.53 ($SD = 4.39$), respectively.

3.2. Bivariate associations

Bivariate analyses revealed significant associations between age, gender, FTND score, and the number of days of pipe/bowl and bong use in the past month and cannabis use characteristics and consequences. Specifically, there was a negative correlation between age and the amount of cannabis used ($r = -.24, p < .01$) and the amount spent on cannabis ($r = -.29, p < .01$). Women ($M = 102.08, SD = 82.13$) reported a higher CWS score than men ($M = 71.81, SD = 60.14$), $F = 12.18, p < .01$. There was a positive correlation between FTND scores and MC total scale scores ($r = .21, p < .01$). A negative correlation was found between the days of pipe/bowl use in the past month and the amount of cannabis used ($r = -.17, p < .01$). A positive correlation was found between the days of bong use in the past month and MPS total scale score, ($r = .11, p < .01$). No significant associations were found between race, marital status and employment status and cannabis use characteristics and consequences. Although there were no significant associations between race and the cannabis use

characteristics and consequences, race was still included as a covariate given that African Americans ($M = 20.72, SD = 11.04$) reported smoking blunts on more days in the past month compared to Whites ($M = 4.93, SD = 9.14$) and other racial/ethnic groups ($M = 11.71, SD = 12.74$), $p < .01$. No other racial/ethnic differences were found in methods of administration.

There was also a significant association found between cannabis use characteristics and consequences, such that the amount of cannabis used was positively associated with MPS scale scores ($r = .06, p < .05$). Each model was adjusted for age, gender, race, FTND score, and the number of days of pipe/bowl and bong use. When assessing the association between blunt and joint use frequency and cannabis use consequences, the amount of cannabis used and the amount spent on cannabis were also included as covariates.

3.3. Cannabis use characteristics and consequences

After controlling for age, gender, FTND score, and the number of days of pipe/bowl and bong use in the past month, the number of days of blunt use was a significant predictor of the average amount of cannabis per using day ($t = 3.04, p < .01$) and the estimated average cost for cannabis ($t = 2.28, p < .05$). The number of days of joint use was not a significant predictor of the average amount of cannabis use per using day ($t = .66, p = .55$) or the estimated average cost for cannabis ($t = -1.09, p = .27$).

As shown in Table 1, the number of days of blunt use was a significant predictor of CWS scale scores in adjusted models, $t = 1.94, p < .05$. Gender ($t = 2.66, p < .01$) and FTND ($t = 2.49, p < .05$) scores were also significantly associated with CWS scores. No significant prediction was found between the number of days of joint use and CWS scale scores, $t = .62, p = .54$.

The number of days of joint use ($t = 0.89, p = 0.38$) and the number of days of blunt use ($t = 0.22, p = 0.83$) were not significant predictors of MCQ scores. As displayed in Table 1, none of the sociodemographic variables were significant predictors of MCQ scores.

The number of days of joint use ($t = 1.92, p = 0.06$) and the number of days of blunt use ($t = -1.26, p = 0.21$) were not significant predictors of MPS scores, as shown in Table 1. However, age was a significant predictor of MPS scores, $t = -3.04, p < .01$.

3.4. Post-hoc analyses

Similar multivariable linear regression analyses were conducted with the two CWS subscale scores as outcomes. In the adjusted models, the number of days of blunt use was a significant predictor of CWS withdrawal intensity subscale scores ($t = 1.83, p < .05$), but not the

negative impact of withdrawal subscale scores, $t = 1.96, p = .81$. Gender ($t = 2.65, p < .05$) and FTND scores ($t = 1.87, p < .05$) were also significant predictors of CWS withdrawal intensity subscale scores.

Bivariate partial correlations were conducted to assess the relationship between the number of days of blunt use and the specific items on the CWS withdrawal intensity subscale while controlling for gender and FTND scores. The number of days of blunt use was positively correlated with not having an appetite ($r = 0.11, p < .05$), mood swings ($r = 0.55, p < .05$), feeling nauseous ($r = 0.11, p < .05$), having a stomachache ($r = 0.11, p < .05$), and not sleeping at night ($r = 0.17, p < .01$).

4. Discussion

The current study was designed to predict the association between the frequency of blunt and joint use and cannabis use characteristics and consequences among cannabis-dependent users who were screened for participation in a multi-site, nation-wide, pharmacotherapy trial. Adults in the sample reported smoking blunts and joints for an average of 11.14 and 6.05 days in the past month, respectively. Participants also commonly used pipes/bowls (8.73 days) and bongs (3.43 days) in the month preceding the baseline assessment. After controlling for other methods of cannabis use, nicotine dependence and sociodemographic characteristics, the number of days of blunt use significantly predicted the average amount of cannabis per using day, the estimated average cost of cannabis and Cannabis Withdrawal Scale scores. The frequency of joint use was not a significant predictor of any of the cannabis use characteristics or consequences.

Consistent with existing literature (Schauer et al., 2017), African Americans were more likely than other racial/ethnic groups to report smoking blunts in the past month, respectively. The elevated rates of blunt use are at least partially due to the aggressive marketing and price promotion of LCC products, especially flavored LCCs that are commonly used to make blunts (Delnevo et al., 2015; Ribisl et al., 2017; Sterling et al., 2016), in communities with high proportions of young adult and African American residents (Cantrell et al., 2013). African Americans and younger adults may also engage in higher rates of blunt use due to the common perception that blunts are safer alternatives to other products, such as cigarettes. For instance, among a sample of young African American men in rural Alabama, blunt smokers believed their product was more natural and less addictive than cigarettes (Sinclair et al., 2013). Moreover, other studies have described subcultural norms for blunt use that distinguishes African American cannabis smokers from other groups of cannabis smokers (Golub et al., 2010; Ream et al., 2006). Additional research is needed to examine the racial disparities

Table 1
Multivariable Linear Regression Models Predicting Cannabis Withdrawal, Craving and Problems ($N = 377$).

Variable	CWS			MCQ			MPS		
	b	t	p	b	t	p	b	t	p
Sociodemographic Characteristics									
Age	-0.16	-1.49	0.14	0.04	0.21	0.83	-0.48	-3.04	< 0.01
Race	0.16	1.45	0.15	-0.01	-0.05	0.96	-0.14	-0.78	0.44
Gender	0.26	2.66	< 0.01	0.09	0.54	0.59	0.21	1.37	0.18
FTND score	0.31	2.49	< 0.05	-0.01	-0.02	0.98	0.13	0.91	0.37
Number of days of pipe/bowl use in past month	0.13	0.73	0.47	0.15	0.74	0.46	0.05	0.29	0.77
Number of days of bong use in past month	0.07	0.49	0.62	0.02	0.15	0.88	0.02	0.13	0.90
Estimated amount of cannabis (grams)	-0.04	-0.27	0.79	0.10	0.54	0.59	-0.03	-0.16	0.87
Estimated amount spent on cannabis (dollars)	0.13	0.84	0.26	0.18	0.95	0.35	0.25	1.47	0.15
Cannabis Use Frequency									
Number of days of blunt use in past month	0.11	1.94	< 0.05	0.05	0.22	0.83	-0.24	-1.26	0.21
Number of days of joint use in past month	0.03	0.62	0.54	0.17	0.89	0.38	0.32	1.92	0.06

Notes. CWS = Cannabis Withdrawal Scale, MCQ = Marijuana Craving Questionnaire, MPS = Marijuana Problem Scale, FTND = Fagerstrom Test for Nicotine Dependence.

observed in blunt use among cannabis-dependent treatment seeking adults.

The frequency of blunt use, but not joint use, was positively associated with the average amount of cannabis per using day and the estimated average cost of cannabis. These findings are consistent with the work of [Mariani et al. \(2011\)](#) which found a higher amount used and amount spent on cannabis per using day among primary blunt ($M = 0.97$ [$SD = 0.47$] grams, $M = \$9.00$ [$SD = \$8.40$]) smokers relative to primary joint ($M = 0.66$ [$SD = 0.45$] grams, $M = \$6.50$ [$SD = 4.00$]) users enrolled in cannabis dependence pharmacotherapy trials. Notwithstanding limitations regarding the self-report of the price and weight of cannabis ([Johnson et al., 2006](#); [Sifaneck et al., 2007](#)), the positive association between the frequency of blunt use and the amount of cannabis per using day suggests that blunts hold more cannabis than joints, which likely adds to its appeal and the higher levels of intoxication following blunt use ([Hughes et al., 2014](#)) among cannabis smokers. Blunts are typically longer and thicker than joints, therefore, more likely to require larger amounts of cannabis to fill the LCC paper. However, blunts are made with both LCC products and blunt wraps, which, similar to joint rolling papers, comes in different sizes. There is no standard length or width among manufacturers for blunt wraps/rolling papers. Further, rolling papers/wraps also vary in terms of thickness. Therefore, the relationship between the physical differences between blunts and joints and the grams of cannabis used in each product is complex. Additional research is needed to examine differences in the physical characteristics of LCC products/blunt wraps and joint rolling papers and its association with the weight and potency of cannabis smoked in blunts and joints. Future research should also examine both blunt and joint users' perceptions of rolling papers and the role it plays in the overall cannabis use experience among cannabis-dependent adults.

The number of days of blunt use in the past month was a significant predictor of cannabis withdrawal symptoms, even when controlling for sociodemographic characteristics, nicotine dependence and other forms of cannabis use. More days of blunt use was associated with higher ratings of physiological (felt nauseous, stomach aches, and not sleeping at night,) and mood-related (mood swings) withdrawal symptoms within the past 24 h. Given that approximately 50–95% of adolescents and adults enrolled in treatment for heavy cannabis use report cannabis withdrawal ([Budney et al., 1999](#); [Coffey et al., 2002](#); [Crowley et al., 1998](#); [Vandrey et al., 2005](#)), it is important to gain a better understanding of factors that are associated with cannabis withdrawal. Other studies have consistently demonstrated a link between factors such as gender, amount of prior cannabis use and expectations and cannabis withdrawal severity and duration ([Budney and Hughes, 2006](#); [Budney et al., 2004](#); [Copersino et al., 2010](#); [Hermann et al., 2015](#); [Sherman et al., 2017](#)). This study extends the literature by displaying the impact of diverse methods of cannabis administration on cannabis withdrawal symptoms among treatment-seeking adults. Blunts produce higher carbon monoxide levels (measured at 10, 30, 60 and 180 min after cannabis administration) than joints ([Cooper and Haney, 2009](#)), suggesting that blunt smokers may be more likely to experience physiological-related symptoms overall such as stomach aches and nausea as reported in the current study. Blunt smokers may also display higher ratings of withdrawal symptoms due to their exposure to both cannabis and nicotine ([Peters et al., 2016](#)), as well as other harmful chemicals found in tobacco (e.g., nornicotine, myosmine; [Danielson et al., 2014](#); [Harris et al., 2015](#); [Lewis et al., 2012](#)). It is also possible that non-cigarette smokers expose themselves to nicotine via blunt use, which increases their risk of initiation of combustible tobacco use. In addition, blunt users often smoke cigarettes or LCCs directly following their blunt use in a practice known as “blunt chasing” ([Sifaneck et al., 2007](#)), thereby increasing risk for both cannabis and nicotine dependence symptoms (e.g., withdrawal). Future studies should include qualitative descriptions of cannabis use among real-world cannabis users to capture important factors that might influence the withdrawal experience

of adults with CUD, including blunt chasing and other factors such as social norms and diverse methods of administration and use patterns among joint and blunt smokers (e.g., [Dunlap et al., 2006](#); [Hughes et al., 2014, 2016](#)).

The withdrawal syndrome for cannabis has significant overlap with that of tobacco ([Vandrey et al., 2005](#)); therefore, additional research is needed to disentangle the true withdrawal effects of LCCs/blunt wraps, cannabis, residual tobacco that is possibly left inside of the LCC when making a blunt and the interaction between these products and substances. While controlling for nicotine dependence in the current study, the regression models were able to tease apart the unique effects of blunt use on withdrawal symptoms that are commonly experienced by both cannabis and tobacco users. Findings suggest that blunt use is linked to cannabis withdrawal symptoms irrespective of cigarette use. As noted above, additional research is needed to further explore the unique relationship between blunts and cannabis withdrawal symptoms. Moreover, future studies should also assess the entire experience of withdrawal beyond 24 h of cannabis cessation. Cannabis withdrawal symptoms tend to onset within 24–72 h after cannabis cessation, peak within a week and will often last about 1–2 weeks ([Budney et al., 2003](#); [Lee et al., 2014](#)). Further, clinicians and researchers might also consider assessing other withdrawal experiences (e.g., the most severe experience) that patients/participants may have had prior to treatment. Despite limitations regarding the assessment of cannabis withdrawal symptoms in the current study, the findings still highlight symptomatology (e.g., physiological and mood-related) that could serve as important targets for treatment among blunt smokers, especially in subgroups with higher rates of blunt use (e.g., African Americans, younger adults, males; [Schauer et al., 2017](#)).

The current study has several strengths, including (1) the use of data from one of the largest studies of cannabis-dependent treatment-seeking adults, (2) diversity in geographical location (within the United States) (3) identification and quantification of different methods of cannabis administration and (4) a robust examination of the relationship between the frequency of use of specific forms of cannabis administration and cannabis use characteristics and consequences. However, a few limitations should be noted. First, inherent to the nature of secondary analyses, the ACCENT trial was not specifically designed to test the proposed hypotheses in the current study. At the very least, this study calls for additional studies that assess the relationship between forms of cannabis administration and outcomes. Second, this study focused primarily on the frequency of blunt and joint use among cannabis-dependent users. However, adult cannabis users often engage in more than one method of administration ([Schauer et al., 2017](#)). In fact, many adults in this sample reported using more than one method of administration (e.g., blunts, joints, bongs) in the past month. This work further emphasizes the importance of assessing the diverse methods of cannabis administration both within and across cannabis-dependent individuals. Third, findings may have been different for non-treatment seeking populations who often have limited interest in treatment for cannabis use. However, given the limited information on treatment-seeking blunt and joint smokers, it is important to provide clinical insight into the cannabis use characteristics and consequences among cannabis-dependent users who are seeking treatment. Moreover, given the increased rates of blunt use and CUD in general and among racially/ethnically diverse populations ([Montgomery and Mantey, 2017](#); [Wu et al., 2016](#)), it is important to further assess the effects of blunt use and other forms of cannabis administration among diverse treatment-seeking and non-treatment seeking samples.

Despite these limitations, findings from this study show that the frequency of blunt use, but not joint use, is a significant predictor of the average amount of cannabis per using day, the estimated average cost of cannabis per using day, and cannabis withdrawal symptoms. CUD treatment might need to be adjusted to specifically target issues related to the methods of cannabis administration. Specifically, blunt users present to treatment with higher amounts of cannabis consumed and

may benefit from treatment that targets physiological and mood-related withdrawal symptoms. Given the high prevalence of blunt use among cannabis-dependent treatment-seeking adults, additional research is needed to understand how blunts and other increasingly popular methods of cannabis administration (e.g., vaping, dabbing) compare to that of traditionally studied joints.

Role of funding source

This study was funded by the National Drug Abuse Treatment Clinical Trials Network (CTN). The Southern Consortium node of the CTN led this trial (NIDA U10DA013727/ UG1 DA013727 PI Brady). Effort for this project was supported by NIDA K23 DA042130 (PI Montgomery), NIDA K01 DA036739 (PI McClure), and NICHHD K12 HD055885 (PI McGinty). Dr. Terry's support during manuscript preparation was by the Office of Academic Affiliations, Advanced Fellowship Program in Mental Illness Research and Treatment, Department of Veterans Affairs.

Contributors

LM wrote the first draft of the manuscript and conducted the analyses. KG served as PI of the parent study and made significant contributions to the writing and editing of the manuscript. EM, RT, SS, TW, GT and JG made significant contributions to writing and editing the manuscript. All authors have approved the final article.

Conflict of interest

No conflicts declared.

Acknowledgements

We wish to thank the staff at the study sites and regional research and training programs of the NIDA CTN who participated in the implementation of this study (Behavioral Health Services of Pickens County, The APT Foundation, University of Kentucky, Integrated Substance Abuse Programs, University of Texas Health Science Center, and CODA). Special thanks to Ashley Morrill, Ricardo Cantu, Sarah Brewer, and Christine Horne at the Medical University of South Carolina. NIDA or the US Government had no role in the study design, collection, analysis or interpretation of the data, writing the manuscript or the decision to submit the paper for publication. This manuscript does not represent the official opinions or views of NIDA or the US Government.

References

Allsop, D., Norberg, M., Copeland, J., Budney, A.J., 2011. The Cannabis Withdrawal Scale development: patterns and predictors of cannabis withdrawal and distress. *Drug Alcohol Depend.* 119, 123–129.

Allsop, D.J., Copeland, J., Norberg, M.M., Fu, S., Molnar, A., Lewis, J., Budney, A., 2012. Quantifying the clinical significance of cannabis withdrawal. *PLoS One* 7, e44864.

Batalia, A., Bhattacharyya, S., Yucel, M., Fusar-Poli, P., Crippa, J.A., Noque, S., Torrens, M., Pujol, J., Farre, M., Martin-Santos, R., 2013. Structural and functional imaging studies in chronic cannabis users: a systematic review of adolescent and adult findings. *PLoS One* 8, e55821.

Budney, A.J., Hughes, J.R., 2006. The cannabis withdrawal syndrome. *Curr. Opin. Psychiatry* 19, 233–238.

Budney, A.J., Novy, P.L., Hughes, J.R., 1999. Marijuana withdrawal among adults seeking treatment for marijuana dependence. *Addiction* 94, 1311–1322.

Budney, A.J., Moore, B.A., Vandrey, R.G., Hughes, J.R., 2003. The time course and significance of cannabis withdrawal. *J. Abnorm. Psychol.* 112, 393–402.

Budney, A.J., Hughes, J.R., Moore, B.A., Vandrey, R., 2004. Review of the validity and significance of cannabis withdrawal syndrome. *Am. J. Psychiatry* 161, 1967–1977.

Cantrell, J., Kreslake, J.M., Ganz, O., Pearson, J.L., Vallone, D., Anesetti-Rothermel, A., Xiao, H., Kirchner, T.R., 2013. Marketing little cigars and cigarillos: advertising, price and associations with neighborhood demographics. *Am. J. Public Health* 103, 1902–1909.

Coffey, C., Carlin, J.B., Degenhardt, L., Lynskey, M., Sanci, L., Patton, G.C., 2002. Cannabis dependence in young adults: an Australian population study. *Addiction* 97,

187–194.

Cohn, A., Johnson, A., Ehleke, S., Villanti, A.C., 2016. Characterizing substance use and mental health profiles of cigar, blunt, and non-blunt marijuana users from the National Survey on Drug Use and Health. *Drug Alcohol Depend.* 160, 105–111.

Cooper, Z.D., Haney, M., 2009. Comparison of subjective, pharmacokinetic, and physiological effects of marijuana smokers as joints and blunts. *Drug Alcohol Depend.* 103, 107–113.

Copersino, M.L., Boyd, S.J., Tashkin, D.P., Huestis, M.A., Heishman, S.J., Derman, J.C., Simmons, M.S., Gorelick, D.A., 2010. Sociodemographic characteristics of cannabis smokers and the experience of cannabis withdrawal. *Am. J. Drug Alcohol Abuse* 36, 311–319.

Cornelius, J.R., Chung, T., Martin, C., Wood, D.S., Clark, D.B., 2008. Cannabis withdrawal is common among treatment-seeking adolescents with cannabis dependence and major depression, as is associated with rapid release to dependence. *Addict. Behav.* 33, 1500–1505.

Crowley, T.J., Macdonald, M.J., Whitmore, E.A., Mikulich, S.K., 1998. Cannabis dependence, withdrawal, and reinforcing effects among adolescents with conduct symptoms and substance use disorders. *Drug Alcohol Depend.* 50, 27–37.

Danielson, K., Putt, F., Truman, P., Kivell, B.M., 2014. The effects of nicotine and tobacco particulate matter on dopamine uptake in the rat brain. *Synapse* 68, 45–60.

Davis, J.P., Smith, D.C., Morphew, J.W., Lei, X., Zhang, S., 2016. Cannabis withdrawal, posttreatment abstinence, and days to first cannabis use among emerging adults in substance use treatment: a prospective study. *J. Drug Issues* 46, 64–83.

Delnevo, C.D., Giovenco, D.P., Ambrose, B.K., Corey, C.G., Conway, K.P., 2015. Preference for flavoured cigar brands among youth, young adults and adults in the USA. *Tob. Control* 24, 389–394.

Dunlap, E., Benoit, E., Sifanek, S.J., Johnson, B.D., 2006. Social constructions of dependency by blunt smokers: qualitative reports. *Int. J. Drug Policy* 17, 171–182.

Fairman, B., 2015. Cannabis problem experiences among users of the tobacco-cannabis combination known as blunts. *Drug Alcohol Depend.* 150, 77–84.

Gates, P.J., Sabioni, P., Copeland, J., Le Foll, B., Gowing, L., 2016. Psychosocial interventions for cannabis use disorder. *Cochrane Database Syst. Rev.* 5 CD005336.

Golub, A., Johnson, B.D., Dunlap, E., 2005. The growth in marijuana use among American youths during the 1990s and the extent of blunt smoking. *J. Ethn. Subst. Abuse* 4, 1–21.

Golub, A., Dunlap, E., Benoit, E., 2010. Drug use and conflict in inner-city African-American relationships in the 2000s. *J. Psychoactive Drugs* 42, 327–337.

Gray, K.M., Sonne, S.C., McClure, E.A., Ghitza, U.E., Matthews, A.G., McRae-Clark, A.L., Carroll, K.M., Potter, J.S., Wiest, K., Mooney, L.J., Hasson, A., Walsh, S.L., Lofwall, M.R., Babalonis, S., Lindblad, R.W., Sparenborg, S., Wahle, A., King, J.S., Baker, N.L., Tomko, R.L., Haynes, L.F., Vandrey, R.G., Levin, F.R., 2017. A randomized placebo-controlled trial of N-acetylcysteine for cannabis use disorder in adults. *Drug Alcohol Depend.* 177, 249–257.

Gruza, R.A., Agrawal, A., Krauss, M.J., Cavazos-Rehg, P., Bierut, L.J., 2016. Recent trends in the prevalence of marijuana use and associated disorders in the United States. *JAMA Psychiatry* 73, 300–301.

Harris, A.C., Tally, L., Muelken, P., Banal, A., Schmidt, C.E., Cao, Q., Lesage, M.G., 2015. Effects of nicotine and minor tobacco alkaloids on intracranial-self-stimulation in rats. *Drug Alcohol Depend.* 153, 330–334.

Heatherton, T.F., Kozlowski, L.T., Frecker, R.C., Fagerstrom, K.O., 1991. The fagerstrom test for nicotine dependence: a revision of the fagerstrom tolerance questionnaire. *Br. J. Addict.* 86, 1119–1127.

Heishman, S.J., Singleton, E.G., Liguori, A., 2001. Marijuana Craving Questionnaire: development and initial validation of a self-report instrument. *Addiction* 96, 1023–1034.

Heishman, S.J., Evans, R.J., Singleton, E.G., Levin, K.H., Copersino, M.L., Gorelick, D.A., 2009. Reliability and validity of a short form of the Marijuana Craving Questionnaire. *Drug Alcohol Depend.* 102, 35–40.

Hermann, E.S., Weerts, E.M., Vandrey, R., 2015. Sex differences in cannabis withdrawal symptoms among treatment-seeking cannabis users. *Exp. Clin. Psychopharmacol.* 23, 415–421.

Hindocha, C., Freeman, T.P., Ferris, J.A., Lynskey, M.T., Winstock, A.R., 2016. No smoke without tobacco: a global overview of cannabis and tobacco routes of administration and their association with intention to quit. *Front. Psychiatry* 7, 104.

Hughes, J.R., Fingar, J.R., Budney, A.J., Naud, S., Helzer, J.E., Callas, P.W., 2014. Marijuana use and intoxication among daily users: an intensive longitudinal study. *Addict. Behav.* 39, 1464–1470.

Hughes, J.R., Naud, S., Budney, A.J., Fingar, J.R., Callas, P.W., 2016. Attempts to stop or reduce daily cannabis use: an intensive natural history study. *Psychol. Addict. Behav.* 30, 389–397.

Johnson, B.D., Bardhi, F., Sifanek, S.J., Dunlap, E., 2006. Marijuana argot as subculture threads: social constructions by users in New York City. *Br. J. Criminol.* 46, 46–77.

Johnston, L.D., O'Malley, P.M., Bachman, J.G., Schulenberg, J.E., 2012. Monitoring the Future National Results on Adolescent Drug Use: Overview of Key Findings, 2011. Institute for Social Research, The University of Michigan, Ann Arbor.

Knapp, A.A., Lee, D.C., Borodovsky, J.T., Auty, S.G., Gabrielli, J., Budney, A.J., 2018. Emerging trends in cannabis administration among adolescent cannabis users. *J. Adolesc. Health* pii: S1054-S1139. [Epub ahead of print].

Krauss, M.J., Rajbhandari, B., Sowles, S.J., Spitznagel, E.L., Cavazos-Rehg, P., 2017. A latent class analysis of poly-marijuana use among young adults. *Addict. Behav.* 159–165.

Lee, D., Schroeder, J.R., Karschner, E.L., Goodwin, R.S., Hirvonen, J., Gorelick, D.A., Huestis, M.A., 2014. Cannabis withdrawal in chronic, frequent cannabis smokers during sustained abstinence within a closed residential environment. *Am. J. Addict.* 23, 234–242.

Lewis, A.J., Truman, P., Hosking, M.R., Miller, J.H., 2012. Monoamine oxidase inhibitory

- activity in tobacco smoke varies with tobacco type. *Tob. Control* 21, 39–43.
- Mariani, J.J., Brooks, D., Haney, M., Levin, F.R., 2011. Quantification and comparison of marijuana smoking practices: blunts, joints and pipes. *Drug Alcohol Depend.* 113, 249–251.
- McClure, E.A., Sonne, S.C., Winhusen, T., Carroll, K.M., Ghitza, U.E., McRae-Clark, A.L., Matthews, A.G., Sharma, G., Van Veldhuisen, P., Vandrey, R.G., Levin, F.R., Weiss, R.D., Lindbald, R., Allen, C., Mooney, L.J., Haynes, L., Brigham, G.S., Sparenborg, S., Hasson, A.L., Gray, K.M., 2014. Achieving cannabis cessation—evaluating N-acetylcysteine treatment (ACCENT): design and implementation of a multi-site, randomized controlled study in the National Institute on Drug Abuse Clinical Trials Network. *Contemp. Clin. Trials* 39, 211–223.
- Montgomery, L., Bagot, K.S., 2016. Let's be blunt: consumption methods matter among Black marijuana smokers. *J. Stud. Alcohol Drugs* 77, 451–456.
- Montgomery, L., Mantey, D.S., 2017. Correlates of blunt smoking among African American, Hispanic/Latino and white adults: results from the 2014 National Survey on Drug Use and Health. *Subst. Use Misuse* 52, 1449–1459.
- Moolchan, E.T., Zimmerman, D., Sehnert, S.S., Zimmerman, D., Huestis, M.A., Epstein, D.H., 2005. Recent marijuana blunt smoking impacts carbon monoxide as a measure of adolescent tobacco abstinence. *Subst. Use Misuse* 40, 231–240.
- Peters, E.N., Schauer, G.L., Rosenberry, Z.R., Pickworth, W.B., 2016. Does marijuana “blunt” smoking contribute to nicotine exposure?: preliminary product testing of nicotine content in wrappers of cigars commonly used for blunt smoking. *Drug Alcohol Depend.* 168, 122–199.
- Ream, G.L., Johnson, B.D., Sifanek, S.J., Dunlap, E., 2006. Distinguishing blunt users from joint users: a comparison of marijuana use subcultures. In: Cole, S.M. (Ed.), *New Research on Street Drugs*. Nova Science Publishers, New York, pp. 235–273.
- Ream, G.L., Benoit, E., Johnson, B.D., Dunlap, E., 2008. Smoking tobacco along with marijuana increases symptoms of cannabis dependence. *Drug Alcohol Depend.* 95, 199–208.
- Ribisl, K.M., D'Angelo, H., Feld, A.L., Schleicher, N.C., Golden, S.D., Luke, D.A., Henriksen, L., 2017. Disparities in tobacco marketing and product availability at the point of sale: results of a national study. *Prev. Med.* 105, 381–388.
- Schauer, G.L., Rosenberry, Z.R., Peters, E.N., 2017. Marijuana and tobacco co-administration in blunts, spliffs and mulled cigarettes: a systematic literature review. *Addict. Behav.* 64, 200–211.
- Shen, J.J., Shan, G., Kim, P.C., Yoo, J.W., Dodge-Francis, C., Lee, Y.J., 2018. Trends and related factors of cannabis-associated emergency department visits in the United States: 2006–2014. *J. Addict. Med.* [Epub ahead of print].
- Sherman, B.J., McRae-Clark, A.L., Baker, N.L., Sonne, S.C., Killeen, T.K., Cloud, K., Gray, K.M., 2017. Gender differences among treatment-seeking adults with cannabis use disorder: clinical profiles of women and men enrolled in the achieving cannabis cessation-evaluating N-acetylcysteine treatment (ACCENT) study. *Am. J. Addict.* 26, 136–144.
- Sifanek, S.J., Ream, G.L., Johnson, B.D., Dunlap, E., 2007. Retail marijuana purchases in designer and commercial markets in New York City: sales units, weights, and prices per gram. *Drug Alcohol Depend.* 90, S40–S51.
- Sinclair, C.F., Foushee, H.R., Scarinci, I., Carroll, W.R., 2013. Perceptions of harm to health from cigarettes, blunts, and marijuana among young adult African American men. *J. Health Care Poor Underserved* 24, 1266–1275.
- Sobell, L.C., Sobell, M.B., Leo, G.I., Cancilla, A., 1988. Reliability of a timeline method: assessing normal drinkers' reports of recent drinking and a comparative evaluation across several populations. *Br. J. Addict.* 83, 393–402.
- Stephens, R.S., Roffman, R.A., Curtin, L., 2000. Comparison of extended versus brief treatments for marijuana use. *J. Consult. Clin. Psychol.* 68, 898–908.
- Sterling, K.L., Fryer, C.S., Fagan, P., 2016. The most natural tobacco used: a qualitative investigation of young adult smokers' risk perceptions of flavored little cigars and cigarillos. *Nicotine Tob. Res.* 18, 827–833.
- Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, 2013. *The TEDS Report: Marijuana Admissions Aged 18 to 30: Early vs. Adult Initiation*. Rockville, M.D. . <https://www.samhsa.gov/data/report/marijuana-admissions-substance-abuse-treatment-aged-18-30-early-vs-adult-initiation>.
- Timberlake, D.S., 2009. A comparison of drug use and dependence between blunt smokers and other cannabis users. *Subst. Use Misuse* 44, 401–415.
- Vandrey, R.G., Budney, A.J., Moore, B.A., Hughes, J.R., 2005. A cross-study comparison of cannabis and tobacco withdrawal. *Am. J. Addict.* 14, 54–63.
- Wu, L.T., Zhu, H., Swartz, M.S., 2016. Trends in cannabis use disorders among racial/ethnic population groups in the United States. *Drug Alcohol Depend.* 165, 181–190.
- Zhu, H., Wu, L.T., 2016. Trends and correlates of cannabis-involved emergency department visits: 2004 to 2011. *J. Addict. Med.* 10, 429–436.