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Andréa Costa Dias PhD [a] , Denise Leite Vieira PhD [a] , Luca Santoro Gomes MsC [a] , Marcelo Ribeiro Araújo PhD [a] & Ronaldo Laranjeira PhD [a]

[a] National Institute on Alcohol and Drug Policies (INPAD), Department of Psychiatry, São Paulo Federal University, São Paulo, Brazil

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Longitudinal Outcomes Among a Cohort of Crack Users After 12 Years from Treatment Discharge

Andréa Costa Dias, PhD
Denise Leite Vieira, PhD
Luca Santoro Gomes, MsC
Marcelo Ribeiro Araújo, PhD
Ronaldo Laranjeira, PhD

ABSTRACT. Follow-ups of crack consumption are scarce in literature. The aim of this article was to investigate the evolution of a cohort of crack users and identify longitudinal outcomes. For the study, 131 consecutive crack users who were admitted to treatment (1992–1994) were interviewed. After 12 years, 107 participants were assessed. Among them, 43 were abstainers, 22 were crack users, 13 had been arrested, 2 were missing, and 27 were dead. The study showed dynamic changes of crack use patterns over time and a high involvement in illegal activities ($p = 0.00$) among drug users. Discontinuation of care and stigmatization of crack users has been discussed.

KEYWORDS. Crack addiction, longitudinal outcomes, treatment, health policies

INTRODUCTION

The use of crack has become significant and widespread in recent years. This increase reflects the expansion of the global market of illicit drugs. In the Americas, it remains strong as ever, and new traffic routes are emerging.[1,2]

In Brazil, the use of crack spread rapidly in the beginning of the 1990s[3–5] and quickly gained ground due to its economic viability, high availability, and the increased move of drug users from intravenous use—considered a risk for possible human immunodeficiency virus (HIV) transmission—to smoking use.[6] Surprisingly, longitudinal studies, particularly those with a long time frame, that have evaluated the ramifications of crack use (as the primary substance) are relatively rare.[7,8]

This study comes from a line of pioneering research in Brazil in the field of crack consumption. We have assessed a cohort of 131 crack users 12 years after they were discharged (1992–1994) from a specialized detoxification unit (Taipas General Hospital [TGH]). The same cohort was previously interviewed at a period of 2 and 5 years after treatment. Discussion of preliminary data of the current study (2005–2006) and the follow-up studies at 2 (1995–1996) and 5 (1998–1999) years can be found in the literature.[9–13] The current study has a descriptive

Andréa Costa Dias, Denise Leite Vieira, Luca Santoro Gomes, Marcelo Ribeiro Araújo, and Ronaldo Laranjeira are affiliated with the National Institute on Alcohol and Drug Policies (INPAD), Department of Psychiatry, São Paulo Federal University, São Paulo, Brazil.

Address correspondence to: Andréa Costa Dias, PhD, Rua Marselhesa, 272 – Vila Clementino 04020-060, São Paulo, SP, Brazil (E-mail: andreaabead@uol.com.br).

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focus and highlights the cohort evolution over the time. Furthermore, the 12-year outcomes between regular crack users and abstainers are compared and discussed.

METHODS

Ethics and Data Assessment

The ethics committee of São Paulo Federal University approved all the procedures. Participants were properly advised concerning study design and signed informed consent forms. Data were collected through face-to-face structured interviews[14,15] during home visits to improve the accuracy of the information gathered.

The investigated parameters examined the patterns of consumption and abstinence from crack at 30 days and the previous 12 months, schooling, employment status, treatment experiences, religiosity, risky sexual behaviors, criminality, imprisonment, illnesses, and death. Government records officially confirmed deaths and arrests. Mortality analysis will be discussed in another publication.

Patterns of crack consumption and abstinence were obtained by self-report. It is important to note that the researcher who conducted the assessments had ongoing contact with the cohort (in the 2- and 5-year follow-ups) and established a professional and trusting relationship with the interviewees. Also, self-report data have been found to be valid to describe substance use.[16]

Setting

TGH has an interdisciplinary unit for detoxification from alcohol and other drugs. The unit can be used by individuals from all over town who can be referred for treatment or enter by self-referral. At the time of the cohort admission, this unit was the only specialized public treatment for crack addiction in São Paulo. The treatment program lasts an average of 2 to 3 weeks. Patients receive psychiatric treatment, individual and group psychotherapy, and occupational therapy.

TABLE 1. Sociodemographic Data of Crack Dependent Patients (N = 131) at the Time of Admission to a Detoxification Unit Between 1992–1994

Variables[a]	*No.*	%
Gender ($n = 131$)		
Male	116	88.5
Female	15	11.5
Age [years] ($n = 131$)		
10–14	3	2.3
15–19	35	26.7
20–24	48	36.6
25–29	20	15.3
30–34	12	9.2
35–40	8	6.1
40–45	5	3.8
Race ($n = 130$)		
Caucasian	97	74.6
Black	33	25.4
Marital status ($n = 130$)		
Single	87	66.9
Married	35	26.9
Divorced	8	6.2
Schooling ($n = 102$)		
Less than 8 years	57	55.9
8 years or more	45	44.1
Employment ($n = 117$)		
Yes	38	33
No	79	67
Past use record of intravenous substances ($n = 122$)		
Yes	35	28.7
No	87	71.3
Onset crack use ($n = 123$)		
$\leq$18 years of age	33	26.8
$\geq$19 years of age	90	73.2

[a]Missing data for some variables are due to the absence of this information in the case-notes.

Participants

Participants' identification was based on admission records, and their selection was conducted consecutively, starting at the opening of the Drugs Unit on May 26, 1992, through December 31, 1994. Participants were selected according to the fulfillment of the diagnostic criteria specific for crack dependence (DSM-IV). Diagnosis was established through a clinical interview with the team of psychiatrists who, at that time, were responsible for admissions.

During treatment, the cohort consisted of 166 men (88.5%) and 15 women (11.5%). Most

of the participants were single (66.9%), young adults (mean age = 23.6 years), and Caucasian (74.6%). Of the participants, 89% lived in areas considered intermediate or poor and 55.9% had less than 8 years of schooling (Table 1). The process employed to locate participants has been discussed in a previous article.[9]

Statistical Analysis

The profile of the participants in the study was described using simple frequencies (*n*) and percentages (%). For the numerical variables, the mean and the standard deviation (*SD*) were calculated.

Chi-square test was used to verify whether the association between the dichotomous variables was significant. The Fisher's exact test has also been used whenever necessary. For those tests, a significance level of 5% was used. Among nondichotomous variables where there was evidence of statistical association ($p < 0.05$), residual analysis was used to identify those categories that differentiated between the groups. It is important to clarify that there was no statistical association between factors such as age, gender, race, schooling, alcohol, tobacco and cannabis consumption (these patterns will be presented in another article) and the following variables: employment, treatment, legal problems, overdose, and risky sexual behavior. Analysis was performed using the SPSS version 13.0 program for Windows (SPSS Inc., Chicago, IL).

RESULTS

Twelve years after discharge from TGH, follow-up evaluations were performed for 107 (81.6%) individuals or relatives. The remaining 24 (18.3%) participants were not located. There was no statistical difference between those were located and those who were not in terms of the data initially collected at the Drugs Treatment Unit admission.

Among the participants who were located, 43 (32.8%) were abstinent from crack (in the previous 12 months), 22 (16.8%) were regular crack users (using 3 or more times a week, in the previous 12 months), 13 (10%) had been arrested, 2 (1.5%) were missing (according to their families), and 27 (20.6%) were dead. No variables measured at index were statistically associated with abstinence or crack use 12 years after treatment (Table 2).

Assessment of Main Outcomes

From the first (1995–1996) to the second follow-up (1998–1999), there was a reversal from the majority of particpants being crack users to the majority of particpants being abstinent. However, there was an increase in the occurrence of incidents related to adverse outcomes such as death, imprisonment, and disappearance. From the second (1998–1999) to the third evaluation (2005–2006), levels of sobriety were still prevalent and there was a decreased incidence of death (Figure 1).

Evolution of the Cohort Throughout Follow-Ups

Most of the 43 abstainers at the 12-year follow-up were also interviewed at the 5-year follow-up. At the 5-year follow-up, 28 of the 43 had been abstinent, 8 were crack users, 4 were imprisoned, 2 were missing, and 1 was not located. Of the 22 who were still using crack at the 12-year follow-up, 7 had been using crack at the previous follow-up, 12 had relapsed from abstinence, and 3 had been imprisoned.

Among the 4 identified deaths at the 12-year follow-up, 1 had not been located at the 5-year follow-up, 2 were using crack, and 1 was abstinent at that time. Among those imprisoned at the time of the 12-year follow-up ($n = 13$), 6 were also imprisoned during the previous 5-year follow-up, 3 had been abstinent, 3 were using crack, and 1 was missing. The 2 individuals who were missing at the 12-year follow-up were also missing previously. Among the patients who were not located ($n = 24$), 8 were crack users in the previous 5-year follow-up, 8 were abstinent, 3 were imprisoned, and 5 had also not been located at that time (Figure 2).

TABLE 2. Admission Variables Tested Between Abstainers and Crack Users[a] ($n = 65$)

Admission Variables	Abstainer		Crack User		p-value <0.05
Age	n	%	n	%	
< 18 years	7	16.3%	5	22.7%	0.376(*F*)
> = 18 years	36	83.7%	17	77.3%	
<21 years	16	37.2%	6	27.3%	0.423
> = 21 years	27	62.8%	16	72.7%	
Gender					
Male	37	86.0%	19	86.4%	0.644(*F*)
Female	6	14.0%	3	13.6%	
Race					
White	33	76.7%	18	81.8%	0.448(*F*)
Black	10	23.3%	4	18.2%	
Civil status					
Single	30	69.8%	14	63.6%	0.794
Civil marriage	11	25.6%	7	31.8%	
Informal marriage	1	2.3%	1	4.5%	
Divorced	1	2.3%			
Employment status					
Employed	14	40.0%	6	33.3%	0.635
Unemployed	21	60.0%	12	66.7%	
Schooling					
Less than 8 years	20	69.0%	11	57.9%	0.433
8 years or more	9	31.0%	8	42.1%	
Onset crack use					
< = 18 years of age	10	25.0%	6	27.3%	0.845
>18 years of age	30	75.0%	16	72.7%	
Crack use before admission (months)					
< = 12 months	20	50.0%	11	50.0%	0.999
> 12 months	20	50.0%	11	50.0%	
Past use record of IV cocaine					
Yes	6	15.4%	7	31.8%	0.120(*F*)
No	33	84.6%	15	68.2%	
Offenses before admission					
Yes	20	50.0%	13	59.1%	0.492
No	20	50.0%	9	40.9%	
Imprisonment before admission					
Yes	8	20.0%	6	27.3%	0.362(*F*)
No	32	80.0%	16	72.7%	
Previous treatments					
Yes	17	50.0%	9	52.9%	0.843
No	17	50.0%	8	47.1%	
HIV					
Yes	1	5.3%	1	8.3%	0.632(*F*)
No	18	94.7%	11	91.7%	
Familly pattern of addiction					
Yes	24	61.5%	12	57.1%	0.740
No	15	38.5%	9	42.9%	

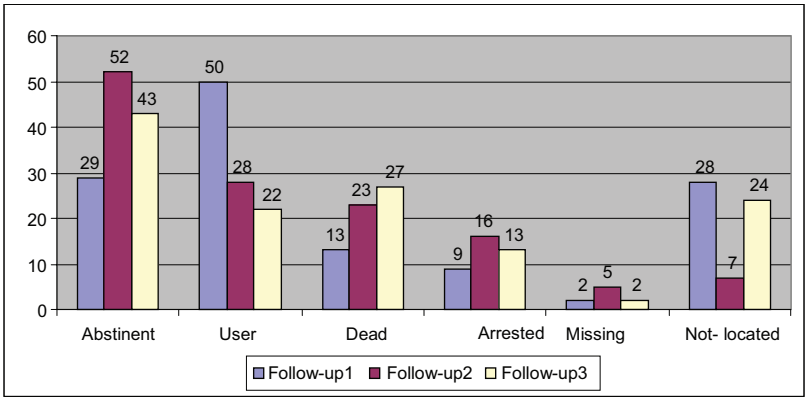
[a]Missing data for some variables are due to the absence of this information in the case-notes.

Crack Users and Abstainers Long Term Outcomes

Employment Status and Schooling

At the 12-year follow-up the vast majority of abstainers and crack users (85%; $n = 54$) had worked in the past 12 months. Those who were abstinent for 30 days (n = 46) were more likely to be employed than users ($n = 8$) during the same period ($p = 0.03$). However, when we examined crack use in the past 12 months, there was no difference in employment ($p = 0.16$)

FIGURE 1. Outcomes at 2 years (1994–1996), 5 years (1998–1999), and 12 years (2005–2006). The original sample included 131 participants. The main outcomes were assessed in 102 participants at the 2-year follow-up, 124 at the 5-year follow-up, and 107 at the 12-year follow-up. (Color figure available online.)



between abstainers ($n = 37$) and users ($n = 17$). Concerning the number of months worked, abstinent individuals (in the previous 12 months) tended to work longer in the year preceding the assessment (mean = 10.9 months; $SD = 2.6$ months) than crack users (mean = 8.7 months; $SD = 3.9$ months) ($p = 0.02$). Of 65 respondents, 43 had a full time job in the informal market ($n = 35$). It is worth mentioning that at the time of index 50% of the same individuals were unemployed, and at the 5-year follow-up most ($n = 47$) had worked in the year preceding the interview.

The level of education among the cohort over the 12 years remained low and did not exceed primary education (49%) (Table 3). Both abstainers and crack users chose not to have additional schooling in the year preceding the

FIGURE 2. The rectangle represents the initial cohort. Abstainers are represented in the squares, users in the circles and the trapezoids represent patients that were imprisoned, missing, or not located. The smaller bold circles are the deaths (recorded in the intervals between discharge and the 2-year follow-up, the 2-year and 5-year follow-ups and the 5-year and 12-year follow-ups).

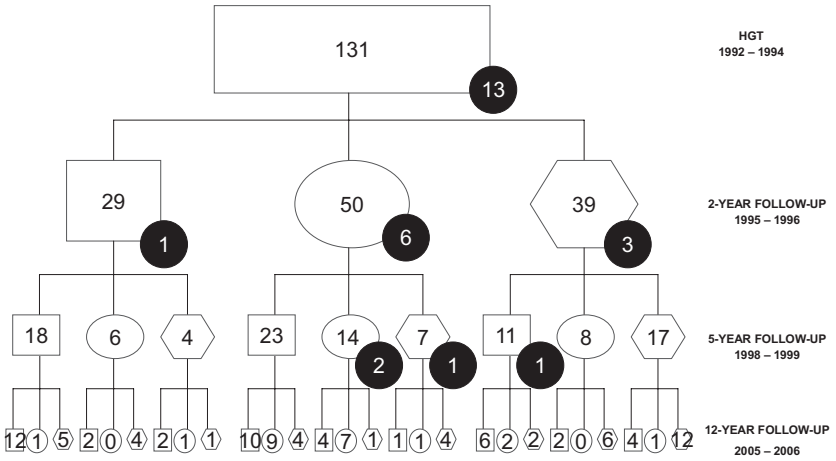


TABLE 3. Results Measured at 12 Years[a] (n = 65)

Variables	Abstinent (last 12 months) n	Abstinent (last 12 months) %	User (last 12 months) n	User (last 12 months) %	P*
Worked during past year					
Yes	37	90.2	17	77.3	0.16
No	4	9.8	5	22.7	
Still in treatment					
Yes	4	10	7	31.8	0.03
No	36	90	15	68.2	
Committed offense since discharge					
Yes	20	48.8	18	85.7	0.00
No	21	51.2	3	14.3	
Has been in prison since discharge					
Yes	16	39	11	52.4	0.31
No	25	61	10	47.6	
Studied during past year					
Yes	9	22	4	18.2	0.35
No	32	78	18	81.8	

[a] Missing data for some variables are due to an inability or refusal to provide that information.
*$P < 0.05$.

interview, and there was no statistical difference in educational pursuit between the two groups.

Legal Issues

Offenses. In this third follow-up, 61% of participants had engaged in some type of illicit activity since discharge, and crack users (for the last 30 days and the previous 12 months) were more likely to commit crimes ($p = 0.02$ and $p = 0.00$) than abstainers. Weekly occurrence was predominant, and drug dealing was the prevalent criminal activity for both abstinent and crack users. The average duration of illegal activities was approximately 3 years and 3 months. There was no difference between those who committed offenses and those who did not in relation to seeking treatment ($p = 0.650$).

Imprisonment. We observed an imprisonment rate related to crack use of 43% at 12 years after discharge from TGH. At intake, only 22% of the same individuals had a history of imprisonment. The three most relevant reasons for problems with the justice system were trafficking (29%), theft (18%), and possession of drugs (15%). The average time of imprisonment was approximately 1 year and 8 months. Abstinent and crack users did not differ in imprisonment variables.

Treatment

Although most of the participants ($n = 51$) were not in treatment at the time of the 12-year assessment (in the previous 12 months), abstinent individuals ($n = 36$) were less likely to seek treatment compared with crack users ($n = 15$) ($p = 0.031$).

However, within the 12-year timeframe 72% ($n = 47$) had received drug assistance since their discharge from TGH. Among them, 23 opted for inpatient treatment, 4 for outpatient, and 20 chose both. Inpatient episodes occurred at least once, with a mean stay of 3.5 months. Over the 12 years, 14 of the 24 individuals who chose the outpatient treatment used this option only once. There were no differences between abstainers and crack users in the treatment modalities chosen.

Religion Issues

In the third study, more than half of the participants ($n = 33$) were not practicing any religious activities, and crack users (in the previous 30 days) were less likely to participate than non-users ($p = 0.020$). However, 29 individuals were involved in these practices (20 abstainers and 9 crack users), with 15 attending the Neo-Pentecostal Brazilian Churches. The duration of

attendance was greater than 12 months (n = 25), and abstainers (in the previous year) were more likely to make weekly visits than crack users ($p = 0.02$).

Risky Sexual Behavior, Overdose, and HIV

Unprotected sex during the period of crack use was common practice for 26 of the respondents at the 12-year follow-up. Crack users (in the previous 12 months) had a higher tendency for this behavior than abstainers ($p = 0.00$).The exchange of sex for drugs was not confirmed by the majority of individuals ($n = 37$). Almost one-third of participants ($n = 18$) reported the occurrence of crack-cocaine overdose. There were no significant differences with respect to age, race, gender, and marital status for any risky sexual behavior or crack-cocaine overdose. In terms of HIV infection, 51 declared themselves as HIV negative, 4 self-reported as HIV-positive, and 7 were unaware of their HIV status.

DISCUSSION

This is the first follow-up in Brazil and one of the few long-term studies in the field of substance abuse in which the entire cohort was composed of crack users. The follow-up of the same cohort for an extended period of time provided relevant descriptive data about the changes of crack use patterns, the vulnerabilities and harm associated to specific practices and behaviors, and the overall influences of life events on drug use.[17–20]

Consumption

In terms of mapping drug use, we did not observe a tendency of decrease in the use of crack for most of our cohort in the early years of follow-up (1995–1996). This finding was different from other studies that reported an initial screening period of interruption of drug use.[21–25] It was only at 5 years after discharge that this situation was reversed, and abstinent participants became the majority. After 12 years, abstainers were still the majority, and slightly more than half of the non-users recorded at 5 years (54%) maintained this condition at 12 years.

In this study, the patterns of abstinence were not established at the outset, but for some individuals, it tended to remain stable over time since this pattern was achieved. On the other hand, we also found dynamic changes in consumption, with alternating periods of abstinence and crack use. The finding points out the potential diversity of crack use trajectories.[26] Besides, these trajectories seem to be related with different moments of each individual's life (well beyond the pharmacological aspects of the drug).

Employment

We observed a high rate of employment between abstainers and crack users at the 12-year assessment (85%), which was sustained since the 5-year follow-up. This may be associated with the global-level improved economic indicators.[27,28] Moreover, the flexibility of the informal job market possibly favored this increase in employment, even though it resulted in the loss of several benefits associated with formally registered work.

In the third follow-up, abstainers were not only more likely to work in the last year, but also to work for a longer period of time. Among crack users, the offer of more flexible jobs might have helped the conciliation of crack consumption and labor activity, probably decreasing the exposure to crack but also showing that, for some users, it is possible to maintain a day-life routine.

Legal Problems

The link between crack use and great vulnerability of involvement in illegal activities is a phenomenon that has already been described in several studies. The involvement in acquisitive crime is closely associated with crack user legal problems.[29–31]

In the current follow-up, crack users indicated a higher prevalence of illegal activities, especially drug trafficking. Besides the higher levels of imprisonment, twice more since discharge, and its long duration (1 year and 8 months) suggest that the cohort was more exposed to law enforcement; strongly as a reflection of a repressive policy that intensified the interventions in punishment, rather than prevention and care.

Comparing the mean time of inpatient episodes (3.5 months) to time in prison, apparently the participants in the study spent more time in prison than in treatment.[32,33]

Treatment

We have noticed a strong tendency toward the interruption and discontinuation of care.[21,34] This was expressed by low treatment frequencies among abstainers and crack users at the time of the evaluation. In addition, abstainers had a higher tendency to discontinue care. This result may reveal that the preference for maintaining care is not sustained once drug use has stopped. Inpatient treatment, which was the most popular model of care, also contributed to the discontinuation of treatment—it tends to be occasional and limited to a specific period. After discharge, most patients are not referred and do not search for or adhere to less intensive but continued forms of care. The higher prevalence of inpatient treatment could be a consequence of a lack of nonresidential public services, at the time of the follow-up study. Also, in Brazil there is a misunderstanding that inpatient treatment is the only possible effective treatment, especially in relating to dependence of crack.

On the other hand, the study shows that the cohort has a history of actively seeking for treatment, both before and after TGH, suggesting that specialized services for drug treatment were part of the repertory of choice of this sample (even if only occasionally) and may have played a role in their recovery.[35,36] It is noteworthy that, in general, the availability and quality of care is not always compatible with the demand, which results in a major barrier to treatment.[37,38] Another difficulty in treating crack users is the extremely limited knowledge regarding the needs in terms of intervention strategies.[39–42]

Religion

Religious practices suggest adherence to a way of life with values that are generally incompatible with drug use, which may result in the reduction or cessation of using. Interestingly, among non-crack users ($n = 36$) who were not in treatment at the time of evaluation, half ($n = 18$) confirmed that they participated in religious activities (mostly for more than a year). Although there are few studies on the role of the religious dimension in human experience, especially in the field of substance abuse, religion has been identified as a positive influence for the improvement of living conditions and health, as well as for promoting values that include "leading a drug -free lifestyle."[43–45] Attending religious activities could be an important resource within a comprehensive network of options for care and attention for crack users, but needless to say this option has to come from the user.

Risky Sexual Behavior

We found a strong link in the literature between frequent and heavier consumption of crack (especially binge behavior) and susceptibility to engage in risky sexual behavior.[46–48] Certain sexual activities have been associated with the recurrent use of crack, and markedly increased the risk of infection with HIV and other sexually transmitted diseases. These activities include unprotected sex, an increased occurrence of sex with multiple partners, and the exchange of sex for money or drugs.[49–51] In the 12-year follow-up, there were no significant differences with respect to age, race, gender, and marital status for any risky sexual behavior. The exchange of sex for drugs was not confirmed by the majority of patients, but unprotected sex was more prevalent between crack users. The craving for crack use compromises safer sex behaviors. Preventive interventions should focus in advice and support within a harm reduction strategy in relation to high-risk sexual behavior.

STUDY LIMITATIONS

This study presented a small sample from a single treatment site and consisted of predominantly male patients; thus, we have little information on female crack users. There were an increased number of individuals who were not located due to successive changes of residence, but this did not compromise the validity of the sample. Also, no physical measure for crack consumption has been applied due to the

highly expensive costs involved by using this type of resource. Options of cultural activities and leisure time—reflecting the access to public services—were not explored.

CONCLUSIONS

Descriptive findings of the evolution of a cohort over the time and longitudinal outcomes related to patterns of abstinence and consumption of crack were addressed in this study. We observed poor access to education, high levels of employment, and dynamic changes in drug use within the years of follow-up. Also, legal problems occurring over a long period of time, as well as brief and poor adherence to treatment, demonstrated that the questions were often negatively skewed with consequent stigmatization and marginalization of users rather than viewing crack use as a public health priority. Changing these views would require efforts to improve sustained interventions for individualized and full care.

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