

Prevalence and predictive factors of psychological morbidity following facial injury: a prospective study of patients attending a maxillofacial outpatient clinic within a major UK city

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Introduction

Those attending maxillofacial trauma services have been identified as presenting with a high risk of comorbid psychological morbidity with between 23%

Adults presenting to maxillofacial surgery services are at high risk of psychological morbidity. This study examined the prevalence of depression, post-traumatic stress disorder (PTSD), anxiety, drug and alcohol use, and appearance-related distress among maxillofacial trauma outpatients over medium-term follow-up. It also explored socio-demographic and injury-related variables associated with psychological distress to inform targeted psychological screening protocols for maxillofacial trauma services. Significant associations were found between level of distress at time of injury and number of traumatic life events with levels of depression at 3 months. No significant associations were found between predictor variables and PTSD at 3 months, or with any psychiatric diagnosis at 6 months. The lack of evidence for an identifiable subgroup of patients who were at higher risk of psychological distress indicated that routine screening of all maxillofacial trauma outpatients should be offered in order to best respond to their mental health needs. The feasibility of the medical team facilitating this is challenging and should ideally be undertaken by psychologists integrated within the MDT. This study led to the funding of a clinical psychologist to provide collaborative care with the maxillofacial surgeons, resulting in brief assessment and treatment to over 600 patients in the first year of the service.

to 41% of individuals presenting with symptoms of depression, anxiety disorders, and post-traumatic stress disorder (PTSD), with significant morbidity even up to 1 year post injury.¹⁻⁵ There are substantial health, social, and economic costs for individuals and communities providing health and social care associated with untreated mental health problems in this group.⁶⁻⁹ Additionally salient to the maxillofacial clinician is that some psychological disorders, for example chronic PTSD, are associated with noted impairments in recovery from physical injury.^{10,11} There are also established risk factors for the development of PTSD, which are relatively easy to assess within health services. Peri- and post-trauma factors are the strongest, most reliable predictors of PTSD¹² and include type and severity of trauma, lack of social support, and further life stress post-trauma. For example, injuries perpetrated by others are more likely to result in PTSD than accidental injury,¹³ which accounts for a significant proportion of maxillofacial injuries that have been intentionally caused. Other consistent risk factors, but with smaller yet consistent predictive strength, include previous adverse life events, abuse in childhood, other previous trauma, history of psychiatric disorder, and socioeconomic and educational disadvantage.^{2,12}

Maxillofacial injury can cause both objective and subjective changes in facial appearance. Visible difference relates to substantial mental health difficulties, with anxiety, depression, and PTSD most prevalent.¹⁴ Facial disfigurement may act as both a trigger and as a maintaining factor in these disorders.¹⁵ Also of relevance is the finding that there is a strong correlation between subjective ratings of facial injury severity (how much individuals believed their appearance differed from “normal”) and poor psychosocial adjustment.¹⁶ However, subjective satisfaction with appearance is not routinely evaluated in maxillofacial injury patients.¹⁷ Consistent with PTSD literature, assault victims report the greatest psychological effects of facial injury at 3- or 6-month follow-up, compared with those who suffer accident and sport-related injuries.^{18,19}

Keywords: facial injury; psychological morbidity; screening

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Following “gold standard” models of trauma care in the US and Australia,²⁰ the UK has recently established major trauma centers (MTCs).²¹ Their aim is to bring together medical specialities to ensure that patients receive expert, integrated care in the immediate aftermath of major traumatic injury that might include maxillofacial surgery. As well as improving the survival rates of those who have suffered life-threatening physical injuries, a key aim is to improve the quality of life of survivors. This “enhanced recovery” pathway, ideally enabling a positive return to family life and work, specifically includes access to psychiatric and psychological assessment and care post-injury where needed.²²

However, MTCs privilege those who have suffered life-threatening physical injuries (often due to road traffic accidents, though not exclusively) and where initial intervention is on an intensive, multidisciplinary inpatient basis. As the onset of psychological disability often follows from relatively less serious incidents or accidents²³ there is arguably a large pool of patients, who present to acute inpatient and outpatient trauma services, such as maxillofacial injury patients, where similarly integrated medical and psychological care is warranted.

Common mental health disorders, including depression, anxiety, PTSD, and appearance-related distress are treatable with evidence-based psychological interventions within primary care services (eg, for PTSD see ref 24). However, various barriers to psychological care following facial injury have been cited, including an underestimation of patients’ psychological needs, low utilization of psychological screening tools, unclear pathways of care to mental health services, and physicians underestimating their influence on patients’ psychological treatment-seeking behavior in maxillofacial trauma clinics.^{25,26} At best this results in haphazard signposting to psychological services within maxillofacial services and at worst untreated mental health difficulties that result in significant distress, disability, and economic cost. Therefore, there is growing impetus to implement effective screening for

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psychological difficulties within maxillofacial services and for coordinated pathways of mental health care to be defined that are integrated with physical recovery for these patients.^{2,27}

Although a growing body of research identifying unmet psychological need in maxillofacial trauma patients does exist,²⁸ there are limitations to most of these studies. Almost all are based on socioeconomically disadvantaged, urban North American populations. Although not dissimilar to those presenting to maxillofacial services in large cities in the UK, access to health-care provision in Europe is markedly different. Only one study of all the literature surveyed² explored a range of common psychological difficulties (PTSD, depression, anxiety, hostility, phobic anxiety, and obsessive compulsive disorder) in a reasonably large prospective cohort beyond a 3-month follow-up period, with good retention rates. They delineated variables predictive of PTSD at one-year: high PTSD symptomology at 1 month, prior psychological disturbance, lifetime social service needs, a paucity of social support immediately post-injury, and high unmet social service needs. However, no similar predictive analyses were provided for those presenting with other mental health needs at 1-year follow-up, nor were concerns about facial appearance included in their study. Finally, the measures

used were screening instruments rather than diagnostic measures, somewhat limiting conclusions about the actual prevalence of psychological need in this group of maxillofacial trauma patients.

This study was set within a real-world secondary care hospital setting within a major urban conurbation in the UK. It was a joint venture between the Oral and Maxillofacial Surgery Department, the Royal London Hospital, Barts Health, and the Institute of Psychotrauma, East London NHS Foundation Trust, a specialist service that provides psychological treatment for Severe and Complex PTSD for the population of East London. Study aims were to establish the prevalence of commonly presenting psychological disorders (depression, anxiety, drug and alcohol use, PTSD, and appearance-related distress) among a large sample of acute maxillofacial trauma outpatients at 1 to 3 months post facial injury. A second aim was to understand how those psychological difficulties evolved over the medium-term; 6 to 9 months post injury, to determine to what degree these fluctuated for better or worse over time. A third aim was to understand which sociodemographic and injury-related variables might be associated with psychological morbidity post-facial injury at these different time points, to better inform screening predictors for potentially “high risk” patients. An overarching aim was to inform guidance for

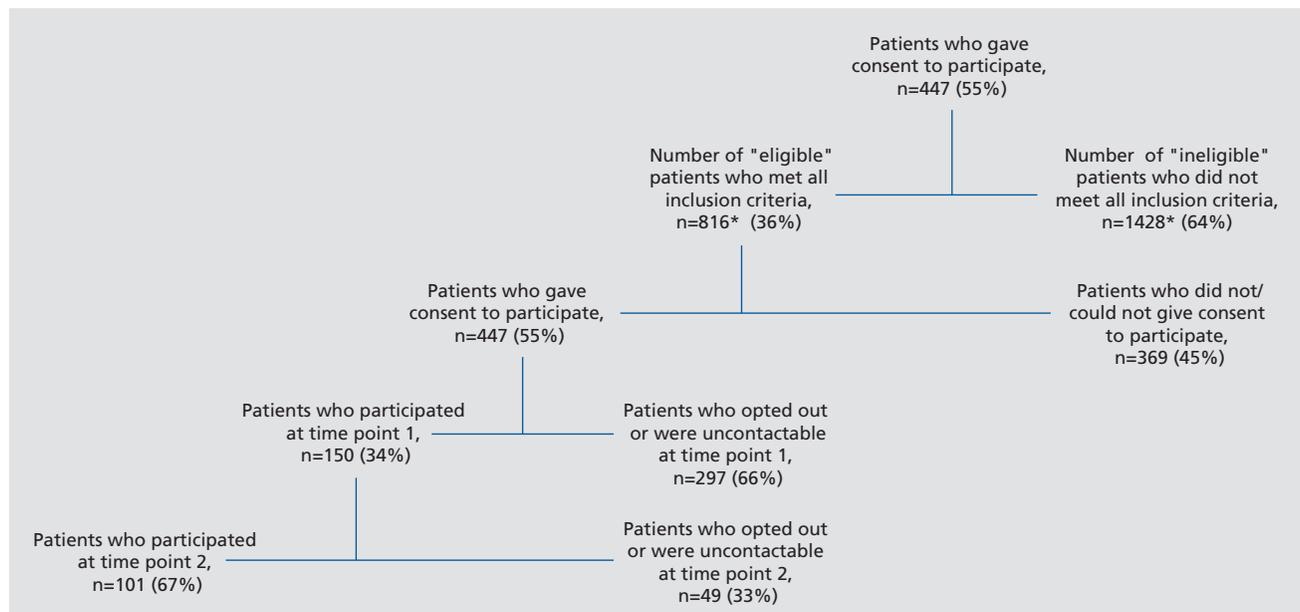


Figure 1. Consort diagram indicating participation in study at each time point. *Estimate based on numbers of patients attending the maxillofacial trauma clinic over two typical clinics

maxillofacial clinicians about the types of psychological problems that are most likely to occur following facial injury and to assist them with the development of screening tools and hence better identify patients that require onward referral for potential assessment and intervention of psychological difficulties.

The aim of establishing the prevalence of psychological disorders was met, including a number of months of follow-up with the majority of initial participants. Various mental health disorders were prevalent in this patient group but predicting who is at greater risk of psychological distress is difficult. Therefore, psychological screening of all patients attending maxillofacial trauma clinics is warranted.

Methods

Participants and procedures

This was a longitudinal, repeated-measure study. Participants were recruited from the Oral and Maxillofacial Surgery Department outpatient clinics at The Royal London Hospital, UK, between January 2012 and March 2013.

Inclusion criteria were: over 18 years old, capable of providing informed written consent, and had received outpatient medical treatment for a facial injury suffered within the previous 2 months.

Exclusion criteria were: suffered severe head injury or a loss of consciousness of more than 15 minutes or of undetermined time at the time of facial injury, or where facial injury was due to a tumor, deliberate self-harm, or other medical (ie, non-traumatic) etiology. In addition, if there was any other medical reason why the treating medic believed that their patient should not be approached for research they were also excluded. At two time points during data collection an audit of the maxillofacial clinic was carried out to estimate the proportion of patients who were not suitable for inclusion in the study at this initial stage of recruitment, and who also refused participation at later stages. To reflect East London's ethnically diverse population, non-English speakers as well as English speakers were invited to take part in the study, and interpreters were offered in subsequent stages of the research where required.

When maxillofacial clinicians assessed that inclusion criteria were met and exclusion criteria ruled

out, researchers approached patients who were asked if they would consider participating in the study. All potential participants were given verbal and written information about the study and given sufficient time to consider whether they wanted to participate in the study.

Structured interviews were carried out comprising information about socio-demographic and injury data and a battery of psychometric measures (outlined below). These were administered by a psychological researcher either face-to face at the Oral and Maxillofacial Surgery Department, or by phone. The interviews took place at two time points. Initial interviews (n=150) were conducted between one and 3 months post-facial injury (referred to as "3 months" or "T1" throughout). This allowed for any potential diagnosis of PTSD to be made in accordance with *DSM-IV* criteria (*DSM-IV* was the most contemporaneous diagnostic classification system in use at the time of the study) that stipulated symptoms must be present for at least 1 month. Second interviews (n=101) were carried out between 6 and 9 months post-facial injury (referred to as "6 months" or "T2" throughout). The Mini-International Neuropsychiatric Interview (MINI) also incorporates questions related to psychological responses to prior traumatic events and provides an estimate of pre-morbid prevalence of PTSD.

If participants met diagnostic criteria for any psychological disorder at either interview they were informed of this and given psychoeducational materials. With their consent, their GP was sent a letter by a clinical psychologist from the Institute of Psychotrauma, with further advice and information about the appropriate local psychological treatment options. Those who did not consent to communication with their GP were advised to contact their GP should their symptoms deteriorate and/or start to impair their quality of life. Participants who presented with risk to themselves or others were assessed by phone by one of the clinical psychologists at the Institute of Psychotrauma within 24 hours of their research interview. If indicated, they were referred to their GP, duty mental health team, or Liaison Psychiatry at The Royal London Hospital for urgent assessment for an urgent psychiatric assessment and given information about crisis services (A&E, MIND, Samaritans, and chaplaincy services).

Participants were reimbursed for any travel costs associated with attending a research interview.

Measures

Demographic data

Demographic data was collected from participants at 3 months, including age, gender, ethnicity, relationship and employment status, the nature and circumstances of their facial injury: cause, time of injury, geographical location, alcohol and drug use at the time of injury, and time taken to seek medical help. The Oral and Maxillofacial Surgery Department provided medical data

Variable	1 to 3 months post facial injury (n=150) T1	6 to 9 months post-facial injury (n=101) T2
Demographic:		
Age	Mean 33 years, SD 11, Range 18–66	Mean 34 years, SD 11, Range 19–66
Gender		
Male	126 (84%)	83 (82%)
Ethnicity		
Asian	22 (15%)	11 (11%)
Black	15 (10%)	11 (11%)
White	106 (71%)	77 (77%)
Other	7 (5%)	2 (2%)
Employment status		
Employed full or part-time	106 (71%)	71 (70%)
Student	16 (11%)	13 (13%)
Unemployed or unable to work	28 (18%)	17 (17%)
Relationship status		
Single	85 (57%)	50 (50%)
In relationship	65 (43%)	50 (50%)
Injury event data:		
Cause of injury		
Assault	76 (51%)	
Fall	30 (20%)	
Road traffic accident	22 (15%)	
Sport	15 (10%)	
Other	7 (5%)	

about participants’ injuries including: type, severity, and site of facial injury.

Time of injury		
Early morning	55 (36%)	
Morning	19 (13%)	
Afternoon	30 (20%)	
Evening	45 (30%)	
Location		
Home	16 (11%)	
Public	128 (85%)	
Other private	5 (3%)	
Alcohol use of patient	66 (44%)	
Drug use of patient	4 (3%)	
How long after incident sought help		
Immediately	124 (83%)	
Within 24 hours	10 (7%)	
<5 days	7 (5%)	
>5 days	6 (4%)	
Distress during event (0–5, 0=no distress, 5=extremely distressed)	Mean 3.51 SD 1.5	
Control during event (0–5, 0=no control, 5=total control)	Mean 1.66 SD 1.8	
Injury data		
Type		
Hard (fracture or break age)	120 (80%)	
Severity		
Minor (no surgery required)	40 (27%)	
Moderate (surgery)	64 (43%)	
Severe (surgery)	43 (29%)	
Site		
Zygoma	29 (19%)	
Mandible	40 (27%)	
Orbital	29 (19%)	
Nasal	10 (7%)	
Multiple	19 (13%)	
Other	16 (11%)	

Table I. Socio-demographic and injury data at timepoint 1 (T1) and timepoint 2 (T2).

Life Events Checklist and psychological state prior to the facial injury

The Life Events Checklist (LEC) is a measure of exposure to potentially traumatizing events through the lifetime²⁹ and was administered to evaluate experiences of trauma prior to facial injury. It comprises a 17-item list of traumatic events for which a participant states whether: (a) the event has happened to them; (b) they have witnessed the event; (c) they learned about the event; (d) they are not sure if the item applies to them; or (e) the item does not apply to them. It has demonstrated adequate temporal stability and good convergence with an established measure of trauma history.³⁰ At 3 months, participants were asked to consider the events in the context of their entire lives. At T2 they were asked only to consider experiences in the period since the time point 1 interview so additional traumatic events within the follow-up period could be noted.

Patients were asked if they had ever received psychological support and whether they had been experiencing the symptoms of PTSD before their facial injury. Data on prior mental health support was collected was to see what proportion of participants were already in contact with mental health services prior to their facial injury. This gave an indication of the level of vulnerability to mental health issues in the sample of participants.

The Mini-International Neuropsychiatric Interview

This is a short, structured, diagnostic interview for *DSM-IV* and *ICD-10* psychiatric disorders routinely used to track outcomes in clinical settings.³¹ It has shown high validation and reliability.³² The subscales relating to major depressive episode, suicidality, PTSD, generalised anxiety disorder, alcohol dependence or abuse, and substance dependence or abuse were administered to participants at 3 months and 6 months.

Levels of distress and control

Levels of distress and control during the facial injury event were measured on a Likert scale of 0 to 5 where 0 is no distress and 5 is extremely distressed, and 0 is no control and 5 is total control.

As the nature of trauma is that it is experienced subjectively by each person, these are subjective measures.

The Derriford Appearance Scale

The Derriford Appearance Scale (DAS-24) assesses subjective concern over appearance, from the point of view of the participant, particularly in relation to issues of adjustment to changes in appearance. Designed for use in clinical and research settings, it has demonstrated good validity and reliability.³³ The measure comprises an initial yes/no question of whether there is an aspect of the participant's appearance of which they are self-conscious. This is followed by 24 statements regarding the participant's relationship with their appearance and body image, to which they are asked to state their level of agreement on a 5-point Likert scale ranging from 1 ("Not at all") to 4 ("Extremely"), with 0 indicating a "Not applicable" response. It is a key aspect of the DAS measure that the experience of concern over facial appearance is subjective. It is the subjective experience of the patient that differentiates between the ones that need psychological support and those that do not. Two people may appear to have the same degree of severity of facial disfigurement, but it is how they experience their appearance themselves that affects their psychological well-being.

Ethical considerations

Ethical approval for the study was obtained from the National Research Ethics Committee (NREC) Bromley. Informed written consent to participation in the research was gained from all participants.

Statistical analyses

Statistical analyses were carried out using SPSS (version 20; IBM, Armonk, NY). Bivariate logistical analyses were carried out to investigate the association between participant and injury risk factors (gender, employment status, relationship status, number of traumatic life events previously experienced, cause of injury, distress during injury, control during injury, severity of injury) and PTSD and depression at 3 months and 6 months. Independent t-tests were carried out to measure differences in mean DAS scores between groups with PTSD or depression at 3 months. The association between independent variables and other psychiatric diagnoses were not carried out at 3 months or 6 months due to the relatively low incidence of other presenting problems.

Results

Socio-demographic and injury data

A total of 150 participants completed the interview at 3 months of which, 101 (67%) participated at 6 months. The demographic characteristics of the participants were inevitably largely similar at each time point. Mean age was 33 years at 3 months (SD=11 years). A majority of participants were male (3 months: 84%; 6 months: 82%) and identified themselves as White (3 months: 71%; 6 months: 77%), however a significant minority were of an ethnic minority background, but a slightly higher proportion of this group were lost to follow-up (50% of Black participants and 33% of Asian participants, compared

with 25% of White participants). At least half the participants were single at each time point (3 months: 57%; 6 months: 50%). Most participants were in some form of employment (3 months: 82%; 6 months: 62%). The most common cause of injury was assault (51%), followed by falls (20%). "Assault" was used in its common use meaning ie, "a physical attack." The nature of the attacks in this patient group included violent muggings, beatings as part of burglaries and sexual attacks, racially motivated and homophobic attacks, and cases of conflict between two or more parties that escalated into violence. Most injuries occurred either in the evening (30%) or early hours of the morning (36%) in a public place (85%) and help was mostly sought immediately (83%). In nearly half of cases, the participant had been under the influence of al-

Variable	1 to 3 months post facial injury (n=150)	6 to 9 months post facial injury (n=101)		
		Total cases at T2	Present at both T1 & T2 (n)	Present at T2 only (n)
Psychological health				
Major depressive episode (Depression)	43 (29%)	17 (17%)	11	6
PTSD	34 (23%)	10 (10%)	10	0
Generalized anxiety disorder	31 (21%)	14 (14%)	7	7
PTSD and depression	28 (19%)	9 (9%)	9	0
Either depression, PTSD, or anxiety	56 (37%)	20 (20%)	17	3
Alcohol dependence	13 (9%)	8 (8%)	4	4
Alcohol abuse	3 (2%)	3 (3%)	0	3
Drug dependence	7 (5%)	5 (5%)	1	4
Drug abuse	2 (1%)	0 (0%)	0	0
Any mental health diagnosis	59 (39%)	27 (27%)	21	6
In receipt of current mental health support	20 (13%)	20 (20%)	10	10
Psychological profile prior to injury				
Mental health support received at any point prior to injury	46 (31%)			
PTSD prior to injury	5 (3%)			
Number of different types of traumatic life events experienced in lifetime (17 types of event assessed)	Mean 2.8 (SD=1.9)	Mean 3.0 (SD=2.1)		
Concern over appearance				
None	63 (42%)	51 (51%)		
Yes, injury related	74 (49%)	40 (40%)		
Yes, not injury related	9 (6%)	9 (9%)		
DAS Score (0-76)	Mean 33.2 (SD=13.2)	Mean 32 (SD=11.8)		

Table II. Psychiatric diagnoses across participants at each time point.

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Variable	PTSD			Depression		
	Odds ratio	Wald statistic	P-value	Odds ratio	Wald statistic	P-value
Demographics						
Gender		0.653	0.419		0.767	0.381
Male	1			1		
Female	1.646			1.657		
Employment status		2.455	0.117		0.008	0.928
Unemployed	1			1		
Employed	0.489			1.042		
Relationship status		0.009	0.926		2.602	0.107
Single	1			1		
In a relationship	0.958			0.496		
Injury event data						
Cause of injury		0.913	0.339		0.384	0.536
Assault	1			1		
Non-assault	0.611			0.744		
Distress during event (0–5, 0=no distress)	1.353	2.713	0.1	1.511	5.293	0.021 (<0.05)
Control during event (0–5, 0=no control)	0.891	0.705	0.401	0.872	1.180	0.277
Injury data:						
Severity of injury		0.143	0.705		0.225	0.636
Surgery required	1			1		
No surgery required	0.823			1.243		
Psychological profile pre-injury						
Traumatic life events experienced personally, prior to injury (0–17 events)	1.237	3.267	0.071	1.278	4.652	0.031 (<0.05)

Table III. Bivariate logistic regression values for predictor variables and PTSD and depression at 1 to 3 months post facial injury.

Presence of mental health condition at T1	Mean DAS Score (\pm SD)	T-statistic	Degrees of freedom	P-value
PTSD (n=33)	47.58 (14.14)	7.025	55.937	<0.005
No PTSD (n=113)	28.97 (9.46)			
Depression (n=42)	44.98 (14.10)	7.111	40.704	<0.005
No depression (n=104)	28.40 (9.29)			

Table IV. Equality of means analyses for DAS score and PTSD and depression at 1 to 3 months post-facial injury.

Surgery requirement at T1	Mean DAS Score (\pm SD)	T-statistic	Degrees of freedom	P-value
Surgery required (n=105)	34.00 (13.70)	-1.610	141	0.085
No surgery required (n=38)	30.05 (10.54)			

Table V. Equality of means analyses for DAS score and surgery requirement at 3 months post-facial injury.

cohol at the time of injury (44%), although this is to be differentiated from the rates of alcohol and drug abuse and dependence stated within the psychiatric disorders section. This rate indicates the prevalence of cases where the use of alcohol was involved in a facial injury event. Relatively high mean levels of distress (3.51 out of 5) and mean low levels of control (1.66 out of 5) were reported at the time of injury, although the standard deviation of each (1.5 and 1.8 respectively) indicate that a wide range of levels of distress and control levels were experienced by the majority of patients. The majority of the participants had suffered a facial fracture (80%) and most had undergone surgery (71%).

Prevalence of psychiatric disorders

Table II shows the prevalence rates of psychiatric disorders and concern over appearance at 1 to 3 months and 6 to 9 months post-facial injury.

At 3 months, 59 participants (39%); and at 6 months, 29 participants (27%) met criteria for at least one psychiatric condition.

At 3 months, 34 participants (23%) met diagnostic criteria for PTSD. This had dropped to ten participants (10%) at 6 months, with no new cases. Prior to their facial injury, 3% of participants were already suffering from PTSD. At 3 months, 43 participants (29%) met diagnostic criteria for Major Depressive Disorder, which had dropped to 17 participants (17%) at six months; six were new cases. At 3 months, 16 participants (11%) reported alcohol or drug use that qualified as dependence or abuse. At 6 months, this became ten participants (10%); six were new cases.

Thirty-nine per cent of those participants with any psychiatric condition at T1 dropped out at T2, compared with a dropout rate of 29% for those without any psychiatric condition. Forty-four per cent of those with PTSD dropped out compared to a dropout rate of 29% for those without PTSD. Forty per cent of those with depression at T1 dropped out at T2, compared with 29% of those without depression at T1.

Analysis of predictor variables of PTSD and depression at 3 months

A significant association was observed between the level of distress perceived during the injury and depression at 3 months ($P < 0.05$).

A significant association was also recorded between the number of types of traumatic life events a participant had experienced prior to facial injury and depression at 3 months ($P < 0.05$).

There were no significant associations observed between the predictor variables and PTSD at 3 months. Similarly, there were no significant associations observed between the predictor variables and PTSD or depression at 6 months. Due to the relatively low prevalence of other psychiatric disorders at 3 or 6 months, analysis of predictor variables for these disorders were not carried out.

Analyses of mean DAS scores between groups with PTSD and depression and surgery requirement at 3 months

DAS scores were found to be significantly higher in participants suffering from PTSD (mean DAS score=47.58 for those with PTSD at 3 months, mean DAS score=28.97 for those without PTSD at 3 months) and those suffering from depression (mean DAS score=44.98 for those with depression 3 months, mean DAS score=28.40 for those without depression at 3 months).

At 3 months, there was no significant difference found in the DAS scores of patients who required surgery and those who did not.

Discussion

Patients presenting with injuries at a maxillofacial trauma outpatient clinic displayed high rates of psychological disorder in both the early phase after injury and at follow-up some months later. Depression, PTSD, anxiety, alcohol and substance use and dependence, and distress about facial appearance were prevalent at both time points. Thirty-nine per cent and 27% of patients met criteria for at least one psychiatric diagnosis 1 to 3 months and 6 to 9 months after injury respectively. These rates are congruent with those of previous research with maxillofacial trauma populations.^{3,34-36} However, these rates of psychological disorder, even at 6 to 9 month follow-up, are significantly elevated with respect to population norms, with the exception of drug dependence. The prevalence of psychopathology at follow-up in this study, compared with rates of adult psychiatric morbidity in a large UK epidemiology survey³⁷ were: depression; 17% vs 2.3%;

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PTSD 10% vs 3.0%; GAD 14% vs 4.4%; alcohol dependence 8.0%, vs 5.9%, and drug dependence 5.9% vs 5.0%. The baseline rate of PTSD in patients (ie prior to their facial injury) was 3%, the same rate as found in the general UK population. This supports the ability to apply the findings of this study to the general population. The follow-up rates of psychopathology in this study are also comparable with the depression and anxiety rates found in a prevalence study carried out in London by Public Health England⁴³: depression 3.5% and anxiety 5.3%.

This study was unusual in attending to patient concerns over facial appearance alongside other psychological concerns. The subjective measure of facial disfigurement, from the point of view of the patient, was a more accurate indicator of both distress over appearance and the presence of PTSD or depression than the objective level of medical intervention required. Whether a patient required surgery, which could be an objective indication of the extent of their facial disfigurement, was not found to be associated with a patient's subjective experience of distress over their facial appearance. Even when patients might be deemed physically recovered by surgeons, this study showed that subjective concerns about facial appearance persisted over time. There were also significant associations between facial appearance distress with both depression and PTSD in the weeks after facial injury.

Very few other significant associations between socio-demographic or injury-related variables and psychological morbidity post-facial injury were found. The more previous traumatic life events patients had experienced and the more traumatic the experience of facial injury, the greater the likelihood of depression immediately afterwards.

Overall, the results of this study do not add to the literature on specific risk factors for the development of the most common psychological problems after facial injury (PTSD and depression) and nor do they suggest that it might be feasible to identify and target a "high risk" subgroup for psychological screening. Instead the relatively high levels of psychiatric morbidity warrant assessment in clinic if treatment is to be offered quickly and increased individual and societal costs minimised.^{38,39} The results support screening for psychological distress with all maxillofacial trauma outpatients, including questions around facial appearance distress, as patient satisfaction with appearance cannot

be assumed to correlate with objective medical recovery and discharge. Concerns about facial appearance were predictive of psychological morbidity and there is evidence that ongoing reminders of traumatic physical injury, such as scarring, can trigger and maintain PTSD symptoms and negative appraisals of changes in facial appearance related to depression.⁴⁰ Alcohol and drug use also warrant particular inclusion in screening, as not only are they problematic medically and psychologically in their own right, but they place the individual at greater risk of future injury, for example through accidents or placing individuals in environments where the risk of interpersonal violence is increased.

These findings support the need for routine psychological screening post-facial injury both relatively soon after injury, but also at subsequent follow-up appointments as some patients will only present with difficulties months after injury. Early screening is important, as there was a disproportionate dropout of participants in the study who were diagnosed with a mental health disorder, particularly those with PTSD or depression. This may or not may relate to the likelihood of attending for future medical appointments, as opposed to participation in a research study, but depression and PTSD might operate to preclude attendance through lack of motivation or avoidance of triggering environments that remind them of traumatic facial injury. Despondently, this might suggest that the 6-month time point rates of psychological distress are conservative, with actual rates being even higher. Hence the argument for early screening is further emphasized.

The results indicated that patients were receptive to being seen by psychologists within maxillofacial clinics and followed-up in person or by phone. What was not explored was the acceptability and utility of self-report screening tools, which would be likely to be more usable and less onerous than face-to-face consultation. These have been used successfully in other studies.²⁸ Although, in principle, surgical teams could administer psychological screening tools in outpatient clinics, our experience of running this research within a very busy maxillofacial clinic challenged the feasibility of this. Despite excellent support and engagement with the research, without a psychologist present, surgeons' capacity to administer psychological screening to participants was at best variable and at worst nonexistent. Other studies have reported that surgeons also underestimate their influence on patients in accessing psychological

care and are generally not familiar with the range of local mental health services available to them or their criteria for referral. Obviously a more uniform screening process by administrative staff might mediate against this, but the surgeons reported that attention to psychological needs was challenging among immediate medical priorities. Even screening tools require post-hoc interpretation and a timely and reliable clinical response, including discussion with the patient, such that facilitated referrals to the GP or mental health services can be made. It is also known that informing GPs of the need for psychological follow-up does not routinely result in patients accessing these services. An increased proportion of patients in the study were, by the time of follow-up, accessing mental health services of some sort. However, as half of those already in receipt of services dropped out of the study, conclusions here are tenuous. It is assumed that the proactive signposting of patients to their GP for further assessment and referral after diagnostic assessment by the research team resulted in this uptake of psychological services by some patients. Further impetus for offering early and ongoing review of psychological need is that the large majority of the research population were young men who are known to be less likely to access mental health care and yet presented in this setting with significant unmet mental health needs.⁴¹ Also of concern was that a disproportionate number of patients from ethnic minorities were lost to follow-up. There is evidence of ethnic variations in pathways to specialist mental health care⁴² in the UK so immediate screening is warranted to maximize the identification of psychological need in these groups.

The combination of these barriers to psychological care suggested to the research team that a collaborative care model that placed psychologists within the medical team is the most reliable way of identifying psychological need and facilitating referral to appropriate and accessible services for individual patients. Subsequent to the research, pilot funding was gained for a clinical psychologist to be embedded within the maxillofacial trauma clinic at the Royal London Hospital. Experience within clinic has borne out the need for facilitated screening, assessment, brief intervention, liaison, and onward referral by a mental health professional due to the high level of need and complexity of presenting problems that require expert collaboration.

Strengths of this study included the use of diagnostic scales that were administered by trained psychological

researchers. These provided accurate data regarding the prevalence of mental health disorders, as opposed to the use of screening tools, which inevitably include false positives and can overstate morbidity in populations under study. This study measured prevalence rates of a range of psychiatric disorders across the two time points, which was a novel aspect compared with the data collected in the existing literature. It involved extensive baseline psychological assessments, was located in a real-world maxillofacial trauma clinic, and included a population of wide socio-demographic variability, typical of trauma patients treated at inner city hospitals. There was also a very robust retention of participants at follow-up, particularly given the transient nature of the population who were from an area of low socioeconomic status. The study team felt that this was a result of patients developing relationships with the researchers, through the research interview, and their provision of self-help resources or liaison with their GP where indicated. There was frequent feedback from patients about the acceptability of mental health assessment and positive support for a psychological presence within the maxillofacial team.

Limitations of this study included the exclusion of some risk factors in socio-demographic data collected that might be related to participants' psychological morbidity, such as social support at the time of injury and immediately afterwards, socioeconomic status and level of education which are known risk factors for PTSD.¹² Similarly, a larger sample size might have revealed stronger associations between predictor variables and the risk of psychological distress in the short and medium-term. Qualitative information gathered during the research process indicated that surgeons were less likely to include some women within the research pathway who had sustained facial injuries as a consequence of domestic violence. Although intended to be an immediate empathic response to their emotional distress it may have inadvertently lead to an underestimation of psychological need across those attending the clinic. Ethically this was also challenging as it meant that the women were less likely to be offered practical and psychological safeguarding. Had further data on the psychological profile of patients prior to the facial injury event been collected, namely on the presence of depression, anxiety and alcohol and drug abuse, the case for generalizing the findings of this study to the general population may have been strengthened. This

information was not collected during data collection (as balance was sought between collecting extensive data and the reasonable involvement time requested of patients), nor was it available on patients' medical records. However, the identical rate of baseline PTSD in this patient group and in the UK population, coupled with the comparable rates of common psychological conditions found in the general London population detailed above, give a strong indication that these results may be expected to apply across the general population. Finally, although substantial resources were provided for interpreters, no non-English speakers were included in the study. The primary barrier to their inclusion was the lack of appropriate language interpreters at the point of first contact within the clinic, ie, when the patient was not known to the research team and therefore unable to anticipate language needs. This could be remedied in the future by the use of a contract with a telephone interpreting service within clinic that was immediately accessible to clinicians.

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Conclusion

Although most people recover from facial injury without associated psychological difficulties, a significant minority experience psychological difficulties that require intervention in the immediate aftermath and beyond. Depression, PTSD, anxiety, appearance-related distress, and alcohol and drug use are treatable with psychological or psychotropic interventions. Routine psychological screening at each outpatient contact by appropriately qualified clinicians who are best placed to facilitate timely, evidence-based care, is most likely to prevent chronic mental illness and the associated social, economic, and vocational disadvantage that can result from untreated psychological conditions. □

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