



Body dysmorphia in dentistry and prosthodontics: A practice based study

Carolina Pérez Rodríguez^{a,*}, Roy B. Judge^a, David Castle^b, Andrea Phillipou^c

^a Melbourne Dental School, The University of Melbourne, Melbourne, 720 Swanston Street, Carlton, VIC, 3010, Australia

^b St Vincent's Hospital and The University of Melbourne, St Vincent's Mental Health Research Unit, 46 Nicholson St, Fitzroy VIC 3065, Australia

^c Centre for Mental Health, Swinburne University of Technology, Hawthorn VIC 3122, Australia

ARTICLE INFO

Keywords:

Body dysmorphic disorder
Physical appearance
Dental aesthetics
Mental health
Screening
Psychology

ABSTRACT

The prevalence of Body Dysmorphic Disorder (BDD) and dysmorphic concern in dentistry and prosthodontics have not been properly assessed, yet the mouth and the teeth are amongst the top preoccupation for these individuals.

Objectives: To evaluate the prevalence of dysmorphic symptoms and BDD using validated tools in patients presenting to general and specialist prosthodontic practice.

Methods: Patients were recruited by two prosthodontics practices and three general dentist practices. Patients were given a Dysmorphic Concern Questionnaire (DCQ) integrated into a medical history form. Treating clinicians also completed a Baseline Rating Form assessing the patients' reason for presentation. Two DCQ score cut-offs were used (9 and 12).

Results: Two hundred and thirteen patients were recruited, the majority of patients showed DCQ scores below 9 (84%). The prevalence of BDD was 7% (cut-off ≥ 9) or 4% (cut-off ≥ 12). Women were more likely to present with high DCQ scores as well as people with a history of mental health problems. The cosmetic practice, the implant clinic, and the prosthodontic practice received a higher proportion of patients with high DCQ scores when compared with the general family practice. The type of procedure was not related to DCQ scores. The defect severity assessment and whether this was amenable to correction was moderately correlated with DCQ scores.

Conclusions: The DCQ seems to be a suitable tool to be used by dentists as part of history taking and patient examination due to its brevity, simplicity and the good sensitivity/specificity reported in the literature.

Clinical significance: Identifying patients with dysmorphia is important before irreversible treatment is carried out due to high levels of dissatisfaction, poor patient centred outcomes and the question of whether these individuals have the capacity to consent.

1. Introduction

Current standards of body image are often unrealistic and can induce feelings of low self-esteem and a distorted view of oneself [1,2]. While body image dissatisfaction has been found to be common in industrialised societies [3–6] an extreme manifestation is Body Dysmorphic Disorder (BDD) defined in the Statistical Manual of Mental Disorder (DSM-5) as a psychiatric condition characterised by an excessive preoccupation with a slight or imagined defect with some aspect of physical appearance [7]. People with BDD experience distress and disability in relation to their physical appearance [8]. Often these patients cannot control their negative thoughts, suffering severe emotional distress that prevents them from engaging in normal daily and

social functioning. People with BDD often employ lengthy rituals of concealment and camouflage in an attempt to soothe their emotional distress [9]. Another key feature is limited insight into the condition, leading those with BDD to seek cosmetic procedures for their perceived defects rather than psychological or psychiatric help [10]. Comorbidities frequently accompanying BDD include depression, anxiety, substance abuse, social phobia, and even suicidal thoughts [10,11].

When concern with physical appearance is present and pre-occupying but does not cause impairment or disability, and remains in a subclinical level, this has been termed “normative discontent” [12] or “dysmorphic concern” [13]. Rather than being pathological, it highlights the importance and pressures that society places on aesthetics and physical perfection.

* Corresponding author.

E-mail addresses: carolpr83@gmail.com (C. Pérez Rodríguez), roybj@unimelb.edu.au (R.B. Judge), djcastle@unimelb.edu.au (D. Castle), andreaiphillipou@swin.edu.au (A. Phillipou).

<https://doi.org/10.1016/j.jdent.2018.12.003>

Received 10 September 2018; Received in revised form 10 December 2018; Accepted 12 December 2018

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Although the aetiology of BDD is still unknown, it is likely to be multifactorial, with neurobiological, psychological and sociocultural factors being implicated [14]. BDD typically starts during adolescence and usually has a chronic course [10,15], with more than one body part becoming the focus of concern over the course of the illness [16].

The prevalence of BDD depends on the population studied, but it is generally believed that 1–2% of the general population [6,17] exhibit the disorder, while the proportion rises to 13–15% in clinics offering cosmetic procedures [18,19].

Cosmetic procedures in these vulnerable patients fail to help them long-term with little improvement in disability [16,20,21]. Often, another body part becomes the focus of obsession.

Although there are effective therapies for BDD, significant barriers to treatment exist. The most commonly reported are embarrassment to share appearance concerns and fear of not being understood. Further to this, BDD remains a relatively unknown condition that many health professionals fail to identify [22].

Limited dental research exists regarding the prevalence of BDD, despite several studies reporting that teeth/mouth are amongst the top preoccupations for BDD patients [16,22]. Teeth have been reported to be the third most prevalent area of concern for BDD patients (45.9%, n 79) after skin (70.9%, n 122) and nose (49.4%, n 85) [22], while Phillips et al. found dental treatments to be sought by $2.5 \pm 4.5\%$ of BDD patients after rhinoplasty, chin surgery and breast surgery [16].

Within dental practices, a study of patients referred for orthodontic treatment found a BDD prevalence of 7.5% [23]. Another study of 160 patients referred for orthognathic maxillofacial surgery found 17% expressed debilitating concern with appearance causing moderate to severe distress and or impairment; 10% of these patients met DSM-IV criteria for BDD [24].

De Jong et al. investigated patients presenting to six clinics offering cosmetic dental treatment. Patients attending “cosmetic clinics” (n 170) believed that their physical appearance was more important than the general population group (n 878), but both groups had an equal proportion of patients with dysmorphic concern. The cosmetic dental group reported significantly more cosmetic procedures in the past (dental and nondental). BDD criteria were met by 4.2% of the cosmetic dental group and 1.5% of the non-dental general population [25]. The researchers developed their own 38 item questionnaire following DSM-IV criteria, but this questionnaire was not validated for BDD.

The evidence would suggest that dental practices - especially those that offer cosmetic procedures - would receive an increased number of patients with body image dissatisfaction and BDD. However, studies exploring BDD prevalence in the different types of dental practice are scarce.

This study aimed to identify the prevalence of sub-clinical and clinical BDD in general and specialist prosthodontic practice. It was hypothesised that a high percentage of patients attending specialist prosthodontics practices would present with symptoms of BDD.

2. Method

Patients were recruited from two public clinics (the Prosthodontic Specialist Department and Implant Clinic at the Royal Dental Hospital of Melbourne), and three private clinics (the Prosthodontic Department at Melbourne Dental Clinic and two private general dental practices in Victoria, Australia).

The private general dental practices were recruited through The eviDent Foundation, a health-promotion charity supporting Australia's only Dental Practice-Based Research Network and part of the Australian Dental Association Victoria Branch.

The psychiatric support team was based at St. Vincent's Hospital Psychiatric Unit of Melbourne.

The study was approved by the University of Melbourne Human Research Ethics Committee (ethics application no. 1646330). All participants provided written informed consent.

2.1. Measures

Both the patient and their treating dentist completed a set of two questionnaires. The two questionnaires are used together to ascertain the prevalence of BDD.

The questionnaire for the patients was a standard medical history form with the self-report dysmorphic concern questionnaire (DCQ) [13] integrated into it. The DCQ is a short dimensional screening tool intended to assess concern with physical appearance; it has also been validated as a screening tool for BDD. The questionnaire consists of seven questions that compare the level of concern with looks in relation to other people on a scale from 0 to 3. The maximum possible score is 21. The DCQ is a valid and reliable tool, sensitive to dysmorphic concern with good internal consistency [13]. Two cut-off scores were considered, a cut-off score of 9 (9–11) indicates an excessive pre-occupation with appearance on a subclinical level, these patients will not meet the full criteria for BDD but might still carry a risk for cosmetic dental procedures. A score of over 12 in conjunction with a minimal aesthetic defect (assessed by objective physical through the clinician questionnaire or “Baseline Rating Form”) indicates probable body dysmorphia [13]. Both cut-off scores are pre-hoc cut points based on previous literature answering different questions and they were both explored as the nature of dysmorphic concern in this population was not clear as it has not been previously studied. Therefore the prevalence of BDD is obtained by a score of over 12 in the DCQ and a minimal aesthetic defect evaluated by the clinician during the examination.

Both, medical questionnaire and DCQ, take approximately ten minutes to answer, with DCQ alone taking two minutes to complete. Some clinicians preferred to leave the patient to answer the questionnaire by themselves and other preferred to do it in a guided manner. Regardless, the clinician would spend some time reviewing the answers with the patient.

The questionnaire for the dentist (“Baseline Rating Form”) rates the patient's concern and the aesthetic defect from the objective point of view of the clinician. The first part included patient demographic data, the presenting complaint, diagnosis and a brief explanation of the procedure requested or proposed. Primary concerns were divided into nine categories (full edentulism, partially dentate, check-up, general dental, implant-related technical complications, aesthetic, failing dentition and or restorations, orthodontic and periodontal). Some concerns belonged to more than one category.

The second part of the questionnaire included four questions that assessed the problem from the point of view of the clinician. Responses were in the form of a Likert scale (0–8). (see Supplementary Material for details).

New patients or existing patients who needed to update their medical history were consecutively recruited. The number of recruited patients (n 213) was a convenience sample but based on similar numbers obtained in the medical literature.

Study information was provided via a Plain Language Statement together with an Informed Consent form. All patients were informed of the voluntary nature of the study and were reassured that non-participation would not affect on-going care. Patients were also warned that some of the questions could lead them to experience some emotional discomfort. The psychiatric team involved in the study was available to provide further information or engage treatment for participants.

3. Statistical analysis

All relevant information was extracted from the medical history forms and the questionnaires and collated in a spreadsheet. The statistical software package used was Minitab Statistical Software, v18; Minitab Inc, State College, Pa.

As well as demographic and distribution data, chi-square tests for association were performed to investigate the relationship between DCQ scores over 9 and over 12 and gender, history of mental health

problems in general, anxiety, type of dentist visited, type of problem or reason for consultation.

Furthermore, phi statistic was used to indicate whether the association between the reason for consultation and DCQ scores was positive or negative.

For the questions asked on an 8-point scale, linear regression was used to assess the strength of association between DCQ scores and the clinician assessment.

4. Results

All tests for association were performed twice, first comparing patients with DCQ scores 9 and above with those 8 and below; and second, comparing patients with DCQ scores 12 and above with those 11 and below. The different scores help determine the difference between subclinical preoccupation with image and probable BDD.

4.1. Demographics

In all 213 patients were recruited, of whom 38% were male. The mean age was 49.0 years, (SD 17.3). Most patients attended general dentists (70%) with the remainder attending specialists (30%). The majority of patients had normal DCQ scores, with 84% scoring below 9, 6% in the 9–11 range and 10% 12 or above.

4.2. Prevalence of BDD

The prevalence of BDD in this cohort of patients was calculated by including patients with high DCQ scores and a defect in the physical appearance rated as slight or minimal by the clinician (score 0–3 in the first question of the clinician questionnaire). When considering a cut-off of ≥ 9 , 7% of patients presented with BDD, while if a more stringent cut-off score of ≥ 12 was used, the prevalence of BDD decreased to 4%.

There was evidence of an association between sex and DCQ scores over 9 ($\chi^2(1) = 10.4$, $p < 0.001$) as well as DCQ scores over 12 ($\chi^2(1) = 4.28$, $p = 0.039$), with women being more likely than men to have high DCQ scores.

4.3. DCQ and mental health

The prevalence of self-reported mental disorders (past or present) amongst participants was 15%, and the prevalence of anxiety specifically was 21.11%. There was evidence of association between anxiety and DCQ scores over 9 ($\chi^2(1) = 4.28$, $p = 0.039$) as well DCQ scores over 12 ($\chi^2(1) = 5.69$, $p = 0.017$). There was evidence of association between mental health problems and DCQ scores over 9 ($\chi^2(1) = 5.94$, $p = 0.015$) as well as DCQ scores over 12 ($\chi^2(1) = 8.66$, $p = 0.003$).

4.4. DCQ and type of dentist

There was no evidence of a relationship between the broad categories of dentists (specialist prosthodontist or general) and DCQ scores over 9 ($\chi^2(1) = 0.02$, $p = 0.887$) or DCQ scores over 12 ($\chi^2(1) = 0.06$, $p = 0.808$). There was evidence of a relationship between the more specific types of dentist and DCQ scores over 9 ($\chi^2(4) = 11.29$, $p = 0.024$) but not DCQ scores over 12 ($\chi^2(4) = 0.28$, $p = 0.281$) (see Table 1).

The general family dental practice had 2.2% of patients with DCQ scores of ≥ 9 and an additional 6.6% of patients with DCQ scores of ≥ 12 . In contrast, the general practice interested in cosmetic procedures and the implant clinic showed higher number of DCQ scores ≥ 9 (17.2% and 10.0% respectively), and DCQ scores ≥ 12 (13.8% and 16.7% respectively). The private prosthodontic specialist clinic had 13.7% of patients with DCQ scores ≥ 12 . (Table 1)

Table 1

Association between type of dentist and DCQ scores.

Type of dentist	DCQ score			N
	less than 9	9 or more	12 or more	
General	83 91.2%	2 2.2%	6 6.6%	91
Implant	22 73.3%	3 10.0%	5 16.7%	30
Cosmetic	20 69.0%	5 17.2%	4 13.8%	29
All general	125 83.3%	10 6.7%	15 10.0%	150
Specialist private	42 82.4%	2 3.9%	7 13.7%	51
Specialist public	11 91.7%	1 8.3%	0 0.0%	12
All specialist	53 84.1%	3 4.8%	7 11.1%	63
All	178 83.6%	13 6.1%	22 10.3%	213

4.5. DCQ and type of concern

Table 2 shows that there was an association between DCQ scores above 9 and 12 and two problem types: check-ups and failing dentition and or restorations. Check-ups were strongly negatively associated with high DCQ scores, with no patients with DCQ scores above 9 presenting for a check-up. Failing dentition was positively associated with high DCQ scores, with patients with DCQ scores above 9 more likely to present with failing dentition.

Thus, apart from check-ups, patients were just as likely to present with high DCQ scores for any type of concern and more likely to present with failing dentition or restorations. (Table 2)

4.6. DCQ and the clinician assessment

The association between DCQ scores and clinician assessment was assessed using linear regression. Question 3 (realistic expectations of procedure) and question 4 (realistic expectations of outcome) were highly correlated (Spearman's rho = 0.947, $p < 0.001$). Due to the high correlation, the average of the responses to Q3 and Q4 was computed. This left three variables to consider in the linear regression: Question 1 (severity of condition); Question 2 (how amenable the condition was to enhancement); and the average of questions 3 and 4 (realistic expectations).

For each of the three variables, a separate linear regression was performed. In all cases, the regression line was statistically significant ($p < 0.001$), but the R^2 values were low, indicating that only a small proportion of the variance was explained by the difference in the clinician's assessment. The average of questions 3 and 4, regarding whether the patient had realistic expectations, explained the greatest variation in the DCQ scores, with $R^2 = 0.150$. Question 2, regarding whether the patient's request is amenable to enhancement with the proposed procedure, explained less variation, ($R^2 = 0.065$); and Question 1, regarding the severity of the patient's condition, explained the least variation in the DCQ scores ($R^2 = 0.053$).

The final question asked of clinicians was whether the patient showed symptoms of BDD. This question had three parts with yes/no answers. Patients were considered to show symptoms of BDD only if the answers to all three questions were in the affirmative.

There was strong evidence of association between clinician-assessed symptoms of BDD and DCQ scores over 9 ($\chi^2(1) = 14.8$, $p < 0.001$) as well as an association between symptoms of BDD and DCQ scores over 12 ($\chi^2(1) = 26.4$, $p < 0.001$).

Table 2
Relationship between DCQ scores and type of problem patients were seeking treatment for.

Type of problem	DCQ Scores 9+			DCQ Scores 12+		
	Chi-square (1 df)	phi	p-value	Chi-square (1 df)	phi	p-value (12+)
Full edentulism	0.047	0.015	0.828	0.517	0.049	0.472
Partially dentate	0.781	−0.061	0.377	0.037	−0.013	0.848
Check up	12.2	−0.239	0.000	7.14	−0.183	0.008
General	0.263	0.035	0.608	0.085	0.020	0.770
Impl. (technical)	0.777	0.060	0.378	0.122	0.024	0.726
Aesthetic	2.86	0.074	0.277	2.86	0.116	0.091
Failing dentition	5.98	0.168	0.014	3.16	0.122	0.075
Orthodontics	3.19	0.122	0.074	1.17	0.074	0.279
Periodontal	2.07	0.099	0.150	0.382	0.042	0.536

5. Discussion

To our knowledge, this is the first study evaluating the prevalence of BDD and dysmorphic concern in a general dental and prosthodontic practice, using validated tools. Although the majority of patients in this study were satisfied with their appearance, 16% of them, mostly women, were not; there was no clear relationship for the type of dentist they visited or the treatment they sought. In addition, a history of mental health problems was correlated with appearance dissatisfaction.

In the present study, moderate levels of dysmorphic concern were found amongst the study patient sample, with 16% of people scoring nine or more in the DCQ, with women being significantly more concerned about their appearance. Unhappiness with appearance is prevalent in industrialised societies [3–6], it is characterised by subclinical BDD symptoms, without displaying the level of impairment or disability that BDD patients do [12]. Stangier et al. [26] found 21.1% of dermatology outpatients had DCQ scores ≥ 11 and 1.9% over 14, while Liao [5] found 3.2% of 487 medical students scored higher than 11 on the DCQ. Wooley and Perry [27] detected 6.9% of 728 oculofacial plastic surgery patients scoring ≥ 9 on the DCQ and Metcalfe [28] identified 17% of mastectomy patients scoring ≥ 9 .

In relation to sex, Bartsch [29], also using the DCQ, found that female Australian students had more body image concerns than their male counterparts. In a separate study, Castle et al. [30] did not find a relationship between DCQ and sex, but in their study younger age was related to higher DCQ scores. Valittu et al. found in a study sample of 254 dental patients that women were more concerned about the appearance of their teeth than men and that different groups of patients have different attitudes towards dental aesthetics [31].

Previous studies [30,32–34] have found correlations between high levels of dysmorphic concern and a history of anxiety and depression, with poor postoperative cosmetic outcomes. A review of the literature [33] found small to moderate relationships between preoperative psychiatric disturbance, anxiety, depression and lower levels of body image evaluation with postoperative satisfaction with cosmetic facial and dental surgery. Sarin [34] found that patients who were more content with their appearance before cosmetic dental treatment had higher levels of satisfaction post-treatment. In our study, a history of mental health problems or anxiety were correlated with higher levels of dysmorphic symptoms; however, postoperative outcomes and their relationship with the other variables were not evaluated.

We did not find any association between DCQ scores or symptoms of BDD and any specific dental treatment request. It could be speculated that treatments considered primarily cosmetic or orthodontic would have attracted more patients with higher levels of dysmorphic concern or BDD symptoms. However, the only type of treatment with a small positive association with DCQ scores over 9 (but not over 12) was “failing restorations or dentition”. This was a heterogeneous group that encompassed problems such as wearing of dentition, fractured teeth, and failing prostheses.

The smile is an important feature determining the attractiveness of a person [35,36] and one could agree that any type of problem that affects the dentofacial complex would negatively impact aesthetics regardless of its aetiology. In this study, patients who presented for routine recalls were less likely to have high DCQ scores or be dissatisfied with their appearance. These findings must be interpreted with caution as the number of patients in each category was low and some of the treatments overlapped; however, this indicates that patients with BDD are just as likely to present for any treatment, not only “cosmetic” procedures.

When considering the type of dentist (general or specialist prosthodontist), the null hypothesis of no difference in the prevalence of dysmorphic symptoms between the two categories could be partially accepted. In this study, the broad categories of dentists showed similar prevalence of DCQ scores, but when looking at the more specific sub-categories within general dentists, the implant clinic and the cosmetic oriented practice had significantly more patients with image dissatisfaction than the family dental practice. In the medical literature, the prevalence of BDD rises considerably in cosmetic surgery settings when compared with general populations. A recent systematic review of 33 publications found 15.04% of BDD patients presenting for plastic surgery and 12.65% for cosmetic dermatology. Most people diagnosed with BDD were women aged 25–40 years [19]. Another systematic review [18] found an overall prevalence of BDD of 13.2% in different cosmetic settings. In a dermatology clinic, 252 patients self-administered DCQ, and 7.9% showed clinically relevant body dysmorphic concern (DCQ ≥ 14) and 8.7% subclinical body dysmorphic concerns (DCQ 11–14); (however, an objective assessment of the defect was not made) [37].

The DCQ does not attempt to diagnose BDD, but to identify individuals for whom preoccupation with physical appearance causes impairment and distress. However, according to DSM-5 diagnostic criteria for BDD, the physical defect has to be minimal or non-existent. Therefore, a patient presenting with a high DCQ score and an objective dento-facial defect seeking restorative treatment cannot be considered to have BDD, in this case, the level of dysmorphic concern would be an appropriate response. Using these criteria, 7% of people had a probable diagnosis of BDD when selecting a cut-off score of 9 on the DCQ; and 4% when selecting a cut-off score of 12. In general, the results of the study showed that the clinicians’ assessment of patients’ expectations, when compared to the DCQ scores, was poor. The severity of the defect assessment and whether this was amenable to correction was moderately correlated with DCQ scores. Assessing patient expectations is arguably one of the most important parts of a preliminary patient interview. Whether the expectations are met or not would categorise the treatment from a patient perspective as a success or a failure despite an objectively favourable technical result [38]. It is therefore paramount to assess not only expectations but also the patient’s motivation for treatment.

In a world increasingly concerned with physical appearance,

cosmetic treatment can lead to high levels of satisfaction when performed correctly, in a fully informed patient [39]. However; the risk vs. the benefit for purely cosmetic procedures must be carefully analysed. Patients may seek cosmetic procedures for emotional and psychological reasons or to please a third person. These situations must be navigated with caution. Practices that routinely carry out complex dental treatments that require an additional level of skill and expertise and involve the aesthetic zone would benefit from utilising the DCQ. Also patients with depression and anxiety, due to their high correlation with symptoms of BDD, should have their level of dysmorphic concern evaluated. Any patient with DCQ scores over 12 must have an exhaustive assessment of cosmetic expectations. If a minimal defect is present, further psychological evaluation is recommended.

The ultimate goal is to reduce unnecessary procedures, that would provide no functional, biological or psychological benefit for patients that may benefit more from psychological help. This should also eliminate potential litigious situations and eliminate any consent ambiguities.

People with BDD often pursue cosmetic and surgical procedures to 'fix' their supposed physical problems [10]. BDD patients also tend to be embarrassed about their concerns and try to hide them from other people. In our study, the nature and aims of the research were explained to the patient in the plain language statement, making it possible that some patients chose not to participate out of fear of judgement. Self-report questionnaires are thought to allow patients to respond more truthfully by eliminating the embarrassment of talking about their symptoms. However, as individuals with BDD often lack insight, it is also possible that these people believe that their concerns are legitimate and do not think that there is anything wrong with them. This would lead to an underestimation of the true prevalence. In this study, the dentist had the opportunity to assess the participants and discuss their concerns during the consultation. However, there was a poor to moderate correlation between the clinician judgement of the patient and the DCQ scores, particularly when the dentists were gauging expectations.

Some clinicians were more effective at recruiting than others, and that is a potential limitation of the study. The response rate for prosthodontists was 40%. However, some clinicians did better recruiting than others, while one clinician recruited 81% of the eligible patients, the other two only recruited 18% of their eligible patient pool.

Both the general family dentist and the cosmetic oriented clinic had a response rate of 86% and 89% respectively.

The overall response rate for the implant clinic was 31%, again the response rate for one clinician was 56% while the other only recruited 5% of eligible patients.

We observed that the way the study was presented to patients mattered. It is also possible that busy clinicians would forget to give the patients the questionnaires or chose not to do it if they were running late.

6. Conclusions

Body dysmorphic disorder is far from being a rare disorder, but clinicians often fail to identify these vulnerable subjects and re-direct them to find appropriate care. Health care professionals should receive further education on how to manage individuals with probable body dysmorphia before they receive irreversible treatment.

While cosmetic procedures can result in high levels of patient satisfaction when performed correctly in a fully informed patient, the removal of healthy dental, osseous or soft tissues to conform to an ideal of beauty without consideration to the immediate and future biological, financial and technical consequences, should be avoided. Thus, expectations of treatment, motivations and psychological well-being to seek cosmetic treatment should be further investigated. The DCQ seems to be a suitable tool to be used by dentists as part of history taking and patient examination due to its brevity, simplicity and the good sensitivity/specificity reported in the literature.

It is important to help patients understand that cosmetic procedures are not devoid of risks and that there is even the possibility that the outcome is worse than the initial situation. It is also important to remind patients before embarking in dental procedures that restorations have a limited life-span and they will need eventually to be replaced. Only then has truly informed consent been obtained.

Funding

This research was funded with grants from Melbourne Dental School and The Australian Prosthodontic Society

Acknowledgements

The authors thank Cameron Patrick, Melbourne Statistical Consulting Centre for the statistical analysis and the eviDent Foundation for helping with the study promotion and practice recruitment. The study was supported by departmental funds from Melbourne Dental School and the Australian Prosthodontic Society. The authors declare no potential conflicts of interest with respect to the authorship and/ or publication of this article.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.jdent.2018.12.003>.

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