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Title of Article: Why does Patient Mental Health Matter? Part 4: Non-carious Tooth Surface Loss as a Consequence of Psychiatric Conditions

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Manuscript title

Why does Patient Mental Health Matter? Part 4: Non-carious Tooth Surface Loss as a Consequence of Psychiatric Conditions

Abstract:

This is the fourth paper in a series looking at psychiatric presentations in dentistry. Since publishing the first paper, the oral health of people with severe mental illness (SMI) has gained significant media attention with the Office of the Chief Dental Officer for England publishing a statement on the importance of prioritising oral health of people with SMI.[1] Members of our group (VA and DS) have also been involved in a consensus statement[2] that sets out a five-year plan to improve oral health in people with SMI. In the previous paper we discussed how a psychiatric disorder can result in dental pathology primarily through self-neglect. This paper will explore tooth surface loss and the potential link with psychiatry, considering the role of the primary dental care team in early recognition of psychiatric presentations. A fictionalised case-based discussion will be utilised to explore this concept.

Clinical Relevance Statement: This paper emphasises the role of the primary care dental team in recognition of psychiatric conditions, such as eating disorders.

Objectives Statement: To provide the reader with a better understanding of links between psychiatry and dentistry using fictionalised case-based discussion.

Body of Manuscript

Introduction

Tooth wear is pathological tooth surface loss (TSL) that is not attributable to dental caries.[3] This wear is often multifactorial in origin and can be as a consequence of erosion, attrition, abrasion or abfraction.[3] The presence of these factors over time and the fact that more people are dentate for longer results in tooth wear compounding by age; in 2008 4% of 16-24-year-olds had some moderate tooth wear compared to 44% of those aged 75-84.[4] However, in 1998 only 1% of 16-24-year-olds had moderate tooth wear, highlighting that younger adults are experiencing a greater increase in tooth wear compared to any other adult age group.[4]

Once tooth wear is recognised, risk factors must be identified in order to appropriately manage and minimise the ongoing consequences. As a non-exhaustive list, wear can be caused by bruxism, chronic vomiting or excessive intake of erosive drinks.[5] Reduced salivary flow rates (e.g. as a side effect of anti-psychotic medication) can also exacerbate existing risk factors.[4] If a psychiatric condition has a role in such contributory risk factors it is important for it to be appropriately considered as part of overall management of tooth wear.

Case

A 17-year-old female patient comes to your dental surgery for a routine examination. She is fit and well and has no medical conditions to report. Your initial impression is that she seems quite slender, wearing baggy clothing and has a pale complexion; her lips appear dry and cracked. She tells you that her teeth feel sensitive, and she is worried that they are becoming brittle, have sharp edges and are discolouring. This has been developing over the last few years and she has been trying to manage it at home using sensitive toothpastes but has finally decided this isn't working.

She tells you she has a 'really good diet, with plenty of fruit' but that she drinks a lot of black coffee and diet fizzy drinks to 'get her through' the day. Intra-orally, there are two distinct ulcers present on the right buccal mucosa. She says she gets these kinds of ulcers all the time and they go away on their own. The patient has no caries or existing restorations, but there is evident tooth-wear and a dry mouth.

In her maxillary dentition, there is palatal surface erosive wear and in mandibular dentition the presentation is in the form of cupping lesions into molar and premolar occlusal surfaces, with additional lingual surface erosion. Her previous examination from two years ago explicitly states that there is no evidence of non-carious tooth surface loss (TSL). In all sextants she has tooth wear that affects <50% of the tooth structure but with distinct surface defects into dentine. Her basic erosive wear examination (BEWE)[3] scores 12 out of a possible 18.

What are our initial thoughts?

In our scenario we have a young female patient presenting with several confounding factors that point to a psychiatric condition underpinning her presentation. The possibility that an eating disorder is related to her dental health is highly likely and Figure 1 explores the contributory elements that highlight reasonable concern.

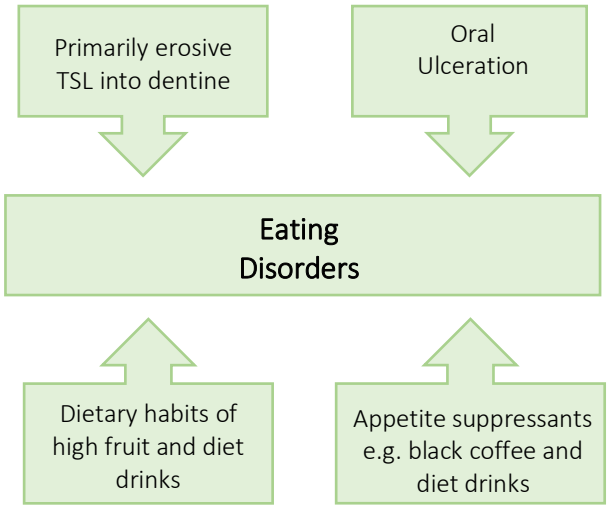

Figure 1: The features of the scenario and how they result in a presentation of potential disordered eating

Eating disorders exist as a group of conditions including anorexia nervosa, bulimia nervosa, binge eating disorder (BED) and 'other specified feeding or eating disorder' (OFSED; Figure 2). Each has its own potential relationship to the patient's presentation and is worth exploring within the context of the scenario.

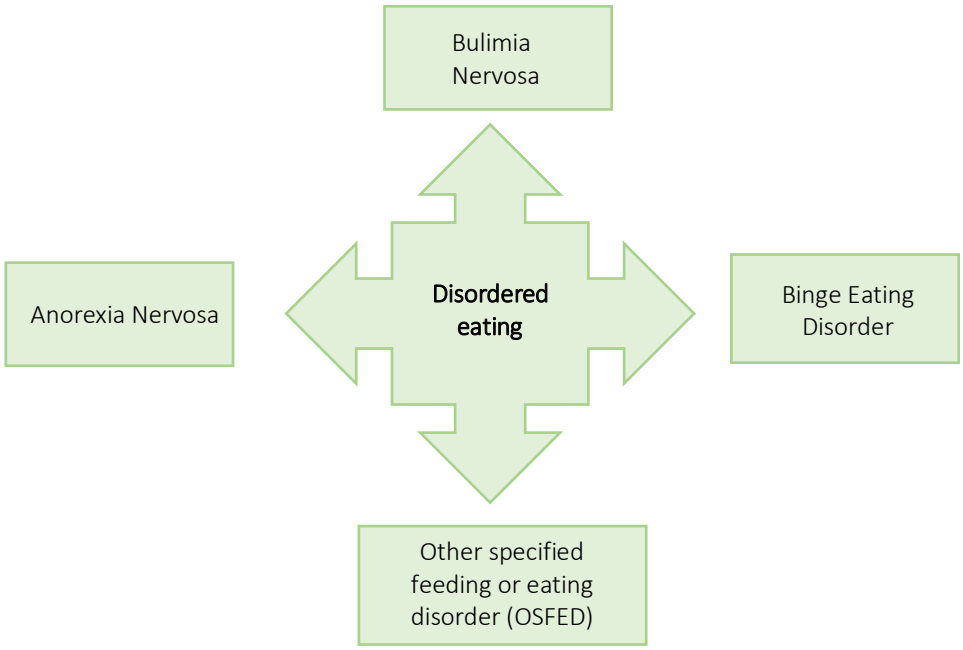

Figure 2: The psychiatric conditions that come under the umbrella of disordered eating

<u>Could her presenting complaint be related to anorexia nervosa?</u>

The overall incidence rate for anorexia nervosa globally is 6 per 100,000 people. However, the incidence is highest in adolescence, specifically those between the ages of 15 and 19 [6] and is higher in women, with men generally accounting for about 10% of cases in the literature.[7] Therefore, clinical signs and symptoms, both dental and systemic, that suggest disordered eating in a young woman, should alert a healthcare professional to consider anorexia nervosa.

The typical presentation of anorexia nervosa has several diagnostic features that are evident in our clinical scenario (Table 1).

Diagnostic feature of Anorexia Nervosa	Relationship to our clinical scenario
Significantly low body weight 'for height, age or developmental history. Or rapid weight loss e.g. >20% body weight in 6 months.[8]	In anorexia nervosa there can be an attempt to disguise weight loss with baggy clothing. The patient could be displaying this behaviour and is additionally presenting with dehydration and other signs of anaemia, including pallor and oral ulceration.
Induced weight loss *(e.g., intake restriction, excessive exercise, use of appetite suppressants, self-induced vomiting).*	Her mention of a 'very healthy' diet with fruits, diet fizzy drinks and black coffee points towards deliberate weight loss or food avoidance. The erosive wear is suggestive or self-induced vomiting or excessive erosive acid consumption.
'Morbid' fear of weight gain with a self-set low weight threshold.	This is unclear in the scenario, but any evidence of such fear (e.g., negative comments about appearance or low self-esteem) would add to concern.

Table 1: The diagnostic features of anorexia and how they relate to the scenario, adapted from a textbook of psychiatry and ICD-11[8,9]

The natural consequence of induced weight loss is vitamin and nutritional deficiency; intra-orally this can manifest as burning mouth syndrome, recurrent oral ulceration, cracked lips and salivary gland dysfunction.[10] This, in addition to non-carious tooth loss, makes it critical for dental professionals to be aware of oral presentations of anorexia nervosa so that an early diagnosis and timely referral and /or intervention can be initiated.

Such oral symptoms of anorexia nervosa, in addition to xerostomia and enamel erosion, can be seen as early as six months into the course of the disease.[11] The patient was last seen two years ago, so a presentation of poor oral health because of anorexia nervosa is plausible. There is no evidence of caries despite overall poor oral health; this is often recognised in the literature which reports that dental caries may be less prevalent due to 'obsessive personality traits and fastidious oral hygiene'.[12]

Around half of those with anorexia nervosa also have bulimia nervosa[13] and the diagnostic criteria for bulimia nervosa recognise that there may be a history or background of anorexia nervosa in the presentation.[9] The patient's predominant complaint is her tooth wear; those with eating disorders are five times more likely to have dental erosion compared to controls.[12] However, those who practice self-induced vomiting are seven times more likely to have dental erosion and worse oral health outcomes.[12] We should therefore consider the role bulimia could play in the patient's tooth wear.

How might a background of bulimia nervosa relate to this presentation?

With a prevalence of 1-2% across Europe, bulimia nervosa is more common than anorexia nervosa,[6] and also disproportionately affects women, with men accounting for less than 10% of cases in the literature.[7] The peak age of onset is between the ages of 16-25; given the patient's age, gender and the overall prevalence/incidence rates, we should consider the role bulimia could play in this scenario. Table 2 highlights the diagnostic features of bulimia and how they may relate to our clinical picture.

Diagnostic feature of Bulimia	Relationship to our clinical scenario
Bingeing and associated food preoccupation.	People with bulimia may have higher caries prevalence due to high carbohydrate intakes during binge cycles.[13] The literature can be conflicted, but generally decayed, missing and filled teeth (DMFT) scores are worsened in those with self-induced vomiting.[11] In our scenario the patient has no active dental caries.
Attempts to counteract binging behaviour *(e.g., self-induced vomiting, self-induced purging, periods of starvation and use of appetite suppressants).*	The erosive wear is suggestive of self-induced vomiting or excessive erosive acid consumption. There is also evidence of the use of appetite suppressants in the form of black coffee and diet fizzy drinks.
'Morbid' fear of weight gain with a self-set low weight threshold. However, there are no weight or weight loss requirements for a diagnosis of bulimia nervosa.	As above, this is unclear in our scenario.
Possible history of anorexia nervosa.	A history of anorexia nervosa may precede a presentation of bulimia nervosa. In our scenario the patient has reported no previous medical conditions, although an earlier diagnosis of anorexia may have gone unrecognised.

Table 2: The diagnostic features of bulimia and how they relate to the scenario, adapted from a textbook of psychiatry and ICD-11[8,9]

Whilst the patient presents with erosive wear that may be more likely in cases of bulimia nervosa, there are certain reasons as to why we may more strongly suspect anorexia nervosa. First, those with bulimia nervosa are typically of normal weight or even slightly overweight[9] and in up to 36% of cases there is parotid gland enlargement, which correlates with frequency of bulimic symptoms.[14] Furthermore, the patient has an absence of dental caries which is more likely in a presentation of anorexia nervosa.

That said, it is important to appreciate that anorexia and bulimia do not necessarily exist independent of each other and can overlap significantly, especially if self-induced vomiting plays a role in an anorexic presentation. Clinical features may not meet the diagnostic criteria for either anorexia or bulimia nervosa; such situations are defined as 'Other Specified Feeding or Eating Disorders' (OSFED) or 'Eating Disorder Not Otherwise Specified' (EDNOS).

What is OSFED and why should we be aware of it?

As a group, eating disorders encompass anorexia nervosa, bulimia nervosa, binge eating disorder (BED) and OSFED/EDNOS.[6,11] BED is a condition characterised by cyclic binge eating causing marked distress, with absence of compensatory behaviours to prevent weight gain, including purging, exercise or starvation.[9] Patients with the condition are often female, but older in age, overweight and do not engage in self-induced vomiting, meaning it is unlikely to play a role in the patients' presentation.[6,8] By contrast OSFED/EDNOS represent the idea that eating disorders can present atypically, mixing components of anorexia and bulimia alike.

Atypical cases of eating disorders are 'the largest single category of eating disorders' with a lifetime prevalence of 4.6% amongst adults and 4.8% amongst young people.[6] As a clinician it is important to be aware of the significant overlap or atypical presentation of eating disorders as they often do not exist as singular entities. As exemplified in our scenario there is likely a background of anorexia nervosa with purging behaviour exacerbating the dental erosion.

What do I do now?

Oral changes are often the first signs of an eating disorder, positioning the primary dental care team for early identification and referral to medical or psychiatric services. The importance of early identification and management is paramount as the medical complications of prolonged disordered eating can result in significant morbidity and mortality (Table 3). NICE guidelines on eating disorders recognise that early identification and involvement with interventional psychological treatment such as cognitive behavioural therapy improves patient outcomes.[15]

Complications of Bulimia Nervosa	Complications of Anorexia Nervosa

1. Aspiration or oesophageal/gastric rupture 2. Hypokalaemia leading to cardiac arrhythmias 3. Cardiomyopathy 4. Pancreatitis	Sudden death (6% of sufferers)[14] as a result of either: 1. Cardiac arrhythmias *(high risk if body weight is less than 35% of ideal)* 2. Suicide
One quarter to one third of all patients have attempted suicide[16]	

Table 3: The complications of ongoing cases of anorexia nervosa and bulimia nervosa[14,16]

Due to the risks mentioned above, a referral or signposting to the patients' general medical practitioner (GMP) or psychiatric services is indicated in this scenario. First we should focus on communicating with the patient about her tooth wear and how this has resulted in chipping and dentine hypersensitivity. This will naturally lead on to a conversation about why her teeth are worn, talking through the possible causes of wear and asking the patient to identify where she thinks the origin might be. This explanation of the diagnosis and tooth wear risk factors will allow you to explore how often she drinks erosive drinks and if there is any self-induced vomiting. An admission of such behaviour makes it easier to recommend that the patient visit her GMP about an eating disorder or to ask whether you can communicate with the GMP on her behalf.

We should then reinforce good oral hygiene practices and the importance of not over-brushing already worn surfaces,[3] additionally recommending Tooth-Mousse or sensitive or high fluoride toothpastes.[3,14] Topical fluoride application in the form of varnish or sodium fluoride mouth rinses have been shown to reduce symptoms of sensitivity.[3] Patients should not brush their teeth for at least thirty minutes after brushing and rinsing with water may dilute the protective action of saliva.[17] Instead further TSL can be mitigated by advising antacid mouth-rinses after self-induced vomiting; one teaspoon of bicarbonate of soda in 250ml water.[17] Xylitol and use of sugar free chewing gum can additionally be used to stimulate salivary flow rates.[17] Diet advice can be difficult to navigate in this scenario, but the patient should be made aware of the negative oral health consequences (damaged and unsightly teeth, pain, lack of function for chewing) of diet fizzy drinks and self-induced vomiting which might provide incentives to curb these destructive behaviours.

Ideally, any attempt at advanced restorative dentistry should be delayed until the underlying eating disorder is stabilised.[13] The initial focus should be on stabilisation using fluoride and temporary restorations to stop dental pain. Anecdotally, some patients may benefit psychologically from aesthetic restorative dental interventions and these nuanced clinical situations should be approached using your best clinical judgement.

Advanced restorative care using indirect restorations should build into the treatment plan the potential for relapse which is high in both anorexia and bulimia nervosa. Half of all anorexics will return to normal weight, but 20% will continue to be anorexic and 6% will die from the illness.[14] In bulimics, around two thirds of patients will relapse within the first year of recovery.[14] Any relapse will result in a return of the risk factors and a perpetuation of the

tooth wear. With such poor recovery rates it may be necessary to limit initial dental treatment on those with eating disorders, to only 'essential restorative work sufficient to limit tooth damage and keep the patient free of pain'.[17]

In conclusion, this clinical scenario requires psychiatric support alongside routine dental management, with the dental professional's awareness for both delayed recovery and potential relapse in planning advanced restorative care.

Declaration

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