The reality of identifying early oral cancer in the general dental practice

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IN BRIEF
- There is heightened responsibility on the GDP for the early diagnosis of cancer but the identification of early disease can be difficult.
- Demonstrates the practical diagnostic problems that face the GDP when maintaining vigilance for the occult primary mouth cancer.
- Advocates a strategy for early diagnosis and proposes guidance for selective opportunistic screening.

Oral cancer has a good prognosis when detected at an early stage yet half of patients diagnosed with oral cancer in the UK have advanced stage disease, for which prognosis is poor. Although most oral tumours are preceded by pre-malignant lesions, the asymptomatic nature of oral cancer, diagnostic delay, and the possibility of hidden tumours, limit the ease at which oral cancer is detected early. Furthermore, in the UK, oral cancer is a relatively rare disease and does not have mutually exclusive signs or symptoms. Responsibility for the early detection of oral cancer is currently placed on the general dental practitioner. However, the current recommendations to screen for oral cancer at every routine check-up is not practical and has not produced the intended results. Selective opportunistic screening may be a more realistic and effective solution and a simple alert system is proposed to assist its implementation.

INTRODUCTION

This article was conceived while attending a disciplinary meeting as an expert witness. A young dentist was being admonished for not recognising the presence of an early oral cancer from which the patient eventually died. The patient (42 years of age) had presented because of a broken denture. It is clear that a full clinical examination was undertaken and a small superficial ulcer was noted on the tongue adjacent to the fracture. Over a period of two weeks, while a new denture was made, the ulcer regressed. The patient was known to smoke but only consumed a modest amount of alcohol. Cancer registration data[1] indicate that in the UK, of the 40-44-year-old age group only 26 males developed tongue cancer each year, making this a particularly rare occurrence.

The patient worked away from home and after a period of six months re-attended as a casual appointment complaining that a clasp had broken off the new denture. The patient was seen as an emergency and an impression was taken to replace the clasp. At the consultation the patient did not report an ulcer, or symptoms relating to an ulcer, and this situation pertained even when the patient consulted his doctor a month later with a submandibular lump. As a result, the general medical practitioner (GMP) referred the patient to hospital with a provisional diagnosis of a salivary stone and only then the true diagnosis of an oral cancer was elicited.

An important part of the inquiry hinged on whether the dentist had undertaken a careful and thorough examination of the mouth at each consultation (neck palpation, examination of each quadrant of the mouth, and tongue palpated) as recommended in National Health Service (NHS) guidelines. The paradox was that the adjudicating panel consisted of dentists, lawyers and lay middle class individuals who will have attended their own dentists regularly over the years. They will have known the answer from personal experience. This raises the question as to whether current standards for examination of the mouth are practical in the real world. The dental contract requires a thorough examination of the oral cavity alongside each course of treatment. The completion of treatment is sealed by a signature confirming this fact if a fee is claimed. The corollary is that if a lesion is overlooked either the examination was performed in a negligent way or if not undertaken then a fraudulent claim has been made.

This article seeks to point out that there is heightened responsibility on the GDP for the early diagnosis of cancer but the identification of early disease can be difficult. It will demonstrate the practical diagnostic problems that face the general dentist when maintaining vigilance for the occult primary mouth cancer and the factors that work against recognition. It cannot be assumed oral cancer is easy to detect. A more encompassing strategy for early diagnosis is advocated.

EXISTING INITIATIVES AND RECOMMENDATIONS FOR THE EARLY DIAGNOSIS OF ORAL CANCER

In the United Kingdom there has been a determined drive to improve cancer results. One of the foundations underpinning this strategy has been the drive to identify cancers early in development. Early detection delivers a smaller tumour that is easier to treat and has an improved prognosis.[2] In addition, the financial and physical cost to both the nation and the patient is reduced.[3-4] The practical application of this initiative is that the NHS introduced a two-week urgent referral system for patients

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suspected of having cancer.[5-6] This system is policed through regular review of hospital data and feedback on missed targets. This has been reinforced by new treatment guidelines[7] that require treatment to commence within 16 weeks of referral from the primary care practitioner or four weeks of a diagnosis being made. These targets have been a genuine asset to oncologists in their drive to provide treatment in a timely manner. However, one side effect is that the pressure for early diagnosis has trickled down to primary care practitioners by way of increased expectation on the part of both the patient and the secondary care services. The relevance of these initiatives to the GDP is that reports produced by senior hospital clinicians have argued that the dental profession is best placed to assume responsibility for the early detection of oral cancer.[8] Given that oral mucosal examination is relatively simple and inexpensive to perform, and oral cancer mostly involves sites that can be readily visualised,[9] there have been numerous calls for oral cancer screening to occur during a patient's dental visit. In a paper on opportunistic oral cancer screening,[10] the British Dental Association recommended that intra-oral soft tissues should be examined systematically and this should be carried out on all patients at that beginning of every new course of treatment. In turn, screening for oral cancer and pre-cancer becomes a part of the routine examination. This view is also held by the World Dental Federation who noted that 'systematic oral mucosal examination, by visual means and digital palpation, should be part of every dental examination procedure'.[11] These may seem both laudable and logical recommendations when viewed in the calm of an academic environment but the evidence would suggest the policy has not been very effective to date. One reason is the relative rarity of oral cancer. The consequence is that the proportion of oral cancers detected early in development has not improved in 50 years. In the period 1960 to 1999, data collated by Hull and Guy's Hospital[12] showed that the proportion of patients diagnosed with early (stage 1 and 2) or advanced (stage 3 and 4) disease has remained approximately the same. More recent data indicate that the proportion of patients referred with advanced stage disease under the care of one surgeon (MMG)
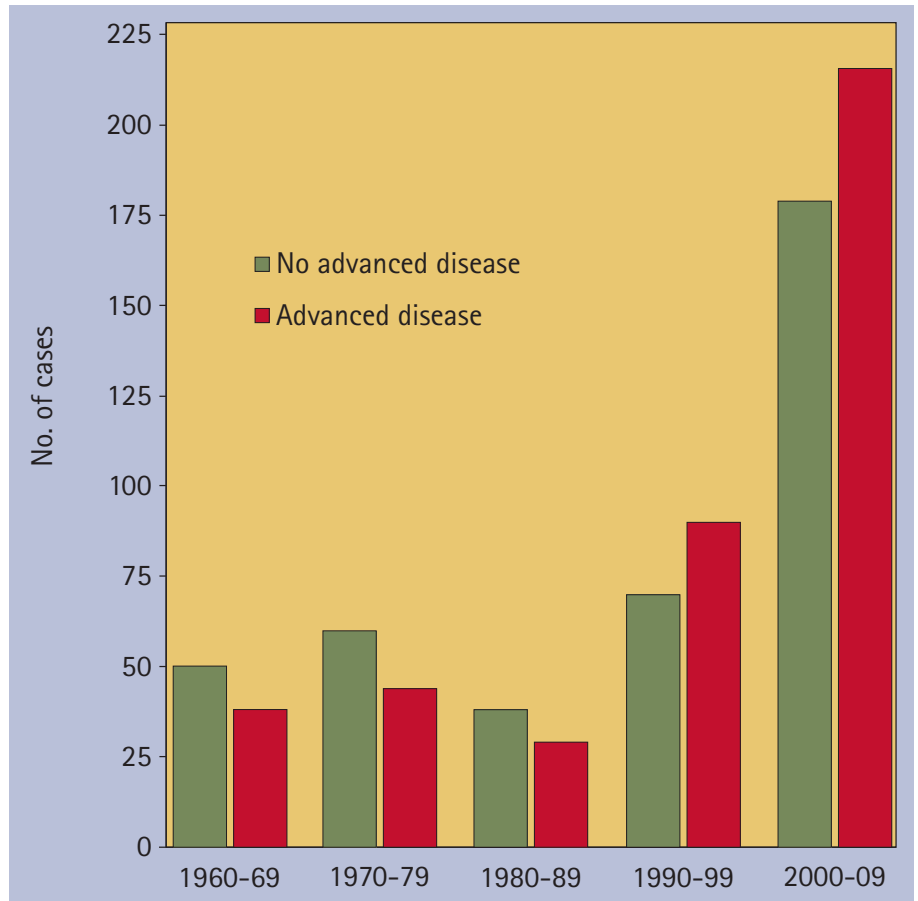

Fig. 1 **Bar chart indicating proportion of early versus advanced oral cancers at Hull and Guy's Hospital, in period 1960–2009**

Table 1 Oral cancer registrations in England[a] in 2006 by age and sex						
	Age (years)					Total
	0–19	20–39	40–59	60–79	80+	
Male	19	99	1,302	1,454	324	3,198
Female	13	92	530	705	374	1,714
Total	32	191	1,832	2,159	698	4,912

[a]C00-C14 Malignant neoplasm of lip, mouth and pharynx as reported by Office for National Statistics (2008)[26]

has not changed since (see Fig. 1). Why has this status quo persisted? The answer is multi-factorial. In addition there are two clinical scenarios with which one has to contend. The first is the prodromal/pre-malignant form of disease and the second is the early evolving cancer.

Symptom recognition

It appears that some 11% of all routine visits to primary care physicians are made for the same symptoms as experienced by a patient with a cancer in the mouth or throat.[13] It is estimated that 5-15% of the population have an oral lesion at any

one time, but very few of these lesions have any malignant potential.[14] If all these 'possible cancers' were referred to the secondary care services for evaluation the hospital services could not cope.[15] The diagnostic dilemma is further complicated by the prevalence of oral ulcers, some of which heal quickly, yet others may persist depending on the underlying pathogenesis. In addition there are candidal patches, papillomas, viral warts, fibrous polyps, and dystrophic patches, all of which might be mistaken for a carcinoma in evolution. UK national guidelines discriminate poorly between potentially malignant and other

oral disease.[15-16] Even when an established cancer is present in the oral cavity it still may not be detected at an early stage of growth. This is because of the asymptomatic nature of early oral cancer. It is intuitive to believe symptoms occur at a reproducible point in development, for example when the lesion has reached a certain size (say 1 cm). But research shows this is not the case. There is no correlation between the onset of symptoms and the size of the tumour at diagnosis[17-18] and approximately 25% of tumours remain silent until they are advanced in size.[19] Thus, symptom recognition is not a reliable method of detecting tumours early in their development. This limits the potential effectiveness of symptom based public health campaigns.

In those with symptoms, diagnostic delay (the time duration between the onset of symptom and receipt of a definitive diagnosis) is a relatively common occurrence. Delay due to the primary care practitioner represents a minor component of the equation. The majority of delay (approximately 80% of cases) is attributable to the patient.[12,20] The data show that even after the self-discovery of oral cancer symptoms, 30% of patients wait more than three months before seeking advice of a healthcare professional.[21] Thus, even if patients do notice early signs and symptoms, they may not present in a timely manner unless public health initiatives become much more effective. A related point is that only 40% of patients with oral cancer present to the dentist;[22] the majority of patients intuitively realise that an ulcer or lump has little to do with their teeth so they seek the advice of a doctor. Unfortunately general medical practitioners have almost no training in oral pathology or the examination of the mouth.[23]

A further problem is the infrequent nature of the disease. The age standardised incidence rates of oral cancer for Europe is approximately seven per 100,000 persons per year.[1] There is a geographical variation with the higher rates occurring in deprived areas.[24] The majority (over 85%) of people affected by this condition are over 50 years of age,[1,25] indicating how uncommon this disease is within the population. Table 1 demonstrates the number of cancer registrations in England[26] by age and sex and indicates that the chance of developing oral cancer before the age of 40 is slim.

The practical application of these facts is illustrated by a study of 25 health centres in Finland where age, sex and primary presenting symptoms were recorded for 5,646 patient visits.[13] The data show that a primary care physician will encounter on average two new cases of head and neck cancer during their entire career which translates into 63,000 patient visits for one tumour to be detected. A similar situation pertains to dentists.[15] The practical implications of this should be borne in mind when setting standards of care. With a pick-up rate of 63,000:1[13] the directive to fully inspect the oral mucosa at every visit is neither achievable nor practical. This is reflected in the low proportion of patients who report having been screened for oral cancer.[27] The reality is that unless the patient draws attention to an early lesion, it is likely to be overlooked.

Tumour recognition

In theory, once the patient presents to the dentist then visual inspection of the oral mucosa has the potential to detect an early occult lesion as a significant number of oral cancers are thought to be preceded by visible changes in the mouth (eg white or red patches, ulcers and swelling/lump).[28] But it is not always easy to see a mouth cancer if it is not drawn to the physician's attention. There are a number of reasons for this situation. The first is that some areas such as the maxillary sinus and nasopharynx are hidden from view and traditionally tumours at these sites present late in the disease process. Also, those tumours that develop in the tonsil and base of tongue frequently migrate beneath the lymphoid layer and so remain hidden from view. They can only be detected by palpation followed by a deep biopsy. A further confounding factor for lesions in the lateral border of the tongue (especially those towards the back of the mouth), is an oral reflex. When the oral cavity is inspected, patients automatically retract their tongue to contact the soft palate so sealing the oral cavity from the oropharynx in order to protect the airway. In doing so, early tumours (1-2 cm) in the lateral tongue or the posterior salivary gutter are obscured. Consequently, unless a patient draws the dentist's attention to an abnormal lesion, or reports an appropriate pattern of symptoms, it is easily possible to overlook an established lesion.

Another factor to be considered is the mental processing of clinical information. All clinicians are painfully aware of intermittently developing a fixed mindset due to repetitive stimuli. Cognitive psychology indicates our attention may be diverted, from the event (misdirection).[29] Furthermore, we invent much of what is 'seen' (illusion).[30] Thus perception is not about capturing a full picture of reality, but taking snapshots of the world and making the rest up.[30] We are hard wired for these tricks of cognitive processing. The consequence is that when busy or under stress (emergency squeezed between appointments) and not prompted by appropriate triggers (ie no symptoms or atypical presentation) we see what we are supposed or expect to see. The old adage 'If you are not looking for a golden sovereign then you will never find one' is true.

The issues presented so far outline the complexity of detecting oral cancer early in development. The evidence suggests that the maxim which insists on a thorough visual and manual examination at every check-up has not worked to date and is unlikely to work in the future no matter how hard the doctrine is pressed. There is a human element to the equation that cannot be overlooked.

POSSIBLE SOLUTIONS

In light of the issues raised in this article and those highlighted by research evidence, we believe that relying on screening for oral cancer at every routine check-up is not practical and has not produced the intended results. Ultimately, molecular screening of saliva may be the answer but such tests are still in evolution. So what is a realistic alternative? Opportunistic screening of higher risk individuals has been calculated to be more cost effective than opportunistically screening all patients (by a dentist or doctor) or invited screening (by a dentist, doctor or specialist).[31] A pilot opportunistic screening initiative in general dental practices[32] concluded that targeting high-risk groups is a realistic option. Although general population oral cancer screening (via visual examination) has not been refuted by research evidence, neither has it received supportive evidence for its effectiveness for reducing mortality or incidence of invasive disease.[33-34]

Table 2 Oral symptoms indicative of oral cancer
• A non-healing ulcer
• Persistent discomfort or pain
• A persistent white or red patch
• A lump or thickening
• Difficulty chewing or swallowing
• Unusual bleeding or numbness in the mouth
• Loose teeth for no apparent reason
• Difficulty moving the jaw
• Speech problems
• A lump in the neck
• Sore throat and earache on same side

1. Please indicate your age			
Under 30 years old ☐	40-50 years old ☐	60-70 years old ☐	80 years old or more ☐

2. Do you smoke or use tobacco?				
No, I have never smoked ☐	I used to smoke ☐	I smoke 1-9 cigarettes a day ☐	I smoke 10-19 cigarettes a day ☐	I smoke 20 or more cigarettes a day ☐

3. In a typical week, including the weekend, how many drinks of alcohol do you drink? If you have stopped drinking alcohol, please tick how many drinks you used to drink.				
I do not drink alcohol ☐	Less than 10 drinks per week ☐	10-20 drinks per week ☐	20-30 drinks per week ☐	More than 30 drinks per week ☐

4. Do you chew, or have you ever chewed, betel quid?	
No ☐	Yes ☐

5. Have you ever had any type of cancer?	
No ☐	Yes ☐

Fig. 2 Example checklist. Increasing red shading indicates increasing risk

However, a study[35] conducted in India did find a significant reduction in oral cancer mortality rates when high-risk individuals were screened for oral cancer.

Who are the high risk individuals? The risk factors for development of oral squamous cell carcinomas include: increasing age, excess alcohol and tobacco consumption (in all their forms), being male, chewing betel nuts, a poor diet, sun exposure, a weakened immune system, and having a previous maligancy.[1] There is a small group of young patients that develop oral cancer with no relevant lifestyle factors. These cancers are thought to be of viral origin[36] and there is no way for the dentist to be forewarned and anticipate their occurrence.

When patients present to the GDP with potential signs and symptoms of oral cancer (see Table 2) they should be thoroughly investigated and a full oral screen should be conducted by the GDP. This does place responsibility on patients to report symptoms and patients should be made aware of this and encouraged to do so. However, when patients are asymptomatic, dentists need guidance on who to screen for oral cancer. For this to be successful, an 'alert system' as a means of identifying the higher risk patients may be required. At present, there are insufficient data in the UK on region specific risk ratios for factors linked to oral cancer to enable an accurate mathematical risk model[37] to be developed. Until such data are available, we suggest that an alert system is based on well established factors such as the patient's age, gender, alcohol and tobacco consumption, and a previous history of

malignancy (the greatest risk of a cancer is a previous cancer),[1,38] as these factors are disproportionately and significantly related to the development of oral cancer compared to other risk factors. Other known risk factors (eg weakened immune system) should of course not be ignored when relevant.

By using these factors we can identify the group of patients who are at a higher risk of oral cancers. We propose that a checklist (eg see Fig. 2 for a working draft) could be dispensed by the receptionist to the patient on each visit and the information passed to the dentist when the patient is seen. This system (which can be embedded in a routine medical history form) will make both the patient and the dentist aware of the prevailing situation and will allow the dentist to apply their diagnostic clinical skills selectively and more effectively. Informing the patient also has the potential to raise awareness of oral cancer. This is particularly important as knowledge and awareness of oral cancer has been found to be lower in high-risk groups[39] and associated with increased patient delay in seeking medical help for potentially malignant oral symptoms.[40] It will also allow routine inquiry into alcohol and tobacco habits which opens scope for preventative advice and assistance. Although there are reports that those attending a dentist are representative of the population as a whole,[32] some

researchers have argued that those are over 40 who smoke and drink are unlikely to be regular attenders.[41-42] This does not mean one should reduce vigilance in the dental practice, but argues for thorough inspection when such patients do attend.

CONCLUSION

Oral cancer is a growing problem in the UK yet has good prognosis when detected at an early stage.[1] Advanced oral cancer, however, has a poor prognosis and high morbidity, treatment costs and poor psychological outcomes.[4,43] The detection of asymptomatic cancer is a problem. Given the limitations of the primary care environment, the recommendations to thoroughly screen all patients attending the dentist does not make practical or financial sense and in the current medico-legal environment can pose a problem to the dentist. The present diagnostic system depends on the primary care practitioner using their discretion and clinical judgement for the process to work effectively. It has to be recognised that clinical judgement can be wrong. Nevertheless clinical judgement should be supported and championed; what must be avoided is a dental service that feels threatened and so abrogates responsibility with the result that cases are referred on the slightest pretext.

It is proposed that excessive reliance should not be placed on the current

recommendations but they should be augmented by opportunistic screening of those patients who are at a higher risk of developing oral cancer, in an attempt to identify the early occult mouth cancer.

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