

The everyday impact of dentine sensitivity: personal and functional aspects

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Research into oral health status and the impact of oral conditions on everyday life has been developed over the last 30 years. To date it is not clear the degree to which these measures can be applied to the problems and impacts associated with dentine sensitivity. There has been very little research on the everyday impact of dentine sensitivity. The aim of this study was to explore the everyday experiences of dentine sensitivity; in particular we were interested in the personal and functional aspects of living with the condition. Participants were purposively recruited from a general population to secure a range of experiences and views about the everyday impact of dentine sensitivity. Participants were adults (≥ 18) currently experiencing dentine sensitivity and were initially recruited using the research team's contacts and snowball sampling. Data were analysed through a framework induced from the data and informed by the literature on chronic illness, coping, illness beliefs along with the general literature on the biopsychosocial impact of oral health. Data analysis focussed on detailing the range of impacts associated with the condition. Twenty three interviews were conducted with 15 females and 8 males. The principal impacts on everyday life were described as pain, impacts on functional status and everyday activities such as eating, drinking, talking, tooth brushing and social interaction in general. Impacts appeared to be related to a range of individual and environmental influences. The data indicate the depth and complexity of the pain experiences associated with dentine sensitivity. The length of a participant's illness career appeared to be related to their degree of control over the condition. These findings are compatible with the psychological literature on pain and confirm that there are significant impacts associated with dentine sensitivity in everyday life. Further research into the everyday nature of dentine sensitive pain would be beneficial.

Keywords: Dentine sensitivity, pain, oral function

INTRODUCTION

Researchers have been exploring a patient centred perspective in dentistry since the 1970s (Cohen and Jago, 1976). Since then a series of socio-dental indicators have been developed (Locker, 1988; Nikias *et al.*, 1980; Reisine *et al.*, 1987; Reisine, 1988) and were summarised at a conference in North Carolina in the 1990s (Slade, 1997a). There are now numerous so called oral health related quality of life measures although the term is somewhat of a misnomer for oral health status (Locker and Allen, 2007). This paper is focussed on oral health status and explores the impact of dentine sensitivity on everyday life.

The most widely used measure of oral health status is the Oral Health Impact Profile (OHIP) (Slade, 1997a, Slade, 1997b, Slade, 1998a, Slade, 1998b; Slade and Spencer, 1994). The OHIP has been shown to have good discriminant and construct validity and, because it focuses on problems specific to oral health has greater utility for measuring the outcomes of oral disorders than generic health status measures such as

the SF-36 (Allen *et al.*, 1999). One key advantage of the OHIP over other oral health status measures is that it is based on a conceptual model of oral health (Locker, 1988). Whilst the claim that it represents this conceptual model has recently been challenged, it remains the most significant measure of general oral health status (Baker *et al.*, 2008).

Bekes *et al.* (Bekes *et al.*, 2009) discovered that a clinical population in Germany attending for treatment for dentine sensitivity were experiencing more impacts and had poorer oral health than a sample of the general population. The study used an adapted version of the OHIP-49 and whilst there was a difference in mean scores of 22.3 between the two samples this difference was not very large on the overall scale of 245. To date these appear to be the only published data using an existing patient centred measure to explore the impact of dentine sensitivity. The extent to which OHIP is appropriate to the specific impacts of dentine sensitivity is unclear. This is because although the OHIP and other measures (McGrath *et*

al., 1999) were based on interviews with participants about the impact of their oral health these basic qualitative data have never been published. We cannot evaluate the extent to which they consider the specific problems of dentine sensitivity.

It is clear from even a brief review of the literature on dentine sensitivity that there is scope for a person centred approach to the condition. Existing clinical reviews focus very little on patients' perspectives (Dababneh *et al.*, 1999; (Dowell and Addy, 1983; Hypersensitivity, 2003; Orchardson and Gillam, 2006). The consensus definition of dentine sensitivity is that it is a "short, sharp pain arising from exposed dentine in response to stimuli typically thermal, evaporative, tactile, osmotic or chemical and which cannot be ascribed to any other form of dental defect or pathology" (Holland *et al.*, 1997, p. 809) makes little mention of the patient's perspective of the condition or general models of health conditions and their impacts. The literature focuses on several aspects of the condition such as its aetiology, incidence and measures of pain. Again there is little reference to patient's perspectives. Several theories propose the underlying mechanism for dentine sensitivity with the evidence appearing to support some form of hydrodynamic mechanism (Dababneh *et al.*, 1999; Dowell and Addy, 1983; Holland *et al.*, 1997; Hypersensitivity, 2003; Orchardson and Gillam, 2006). The literature also describes the numerous aetiological factors associated with dentine sensitivity and it has been suggested that it takes a combination of these factors, most notably, erosion and abrasion to result in sufficient tissue loss for sensitivity to occur (Absi *et al.*, 1992; Dababneh *et al.*, 1999; Orchardson and Gillam, 2006). There is little reflection on the wider social and political implications of discovering that it is the discipline of tooth brushing, in combination with an erosive diet that can act as one of the biggest predisposing factors for dentine sensitivity. Difficulties of diagnosing the condition have led to widely varying estimates of its prevalence, with some risk of overestimation. In a study of regular attenders at a general practice population in London, 52% of subjects reported having dentine sensitivity with females having a higher prevalence than males. Data collected from a Korean sample at the same time reported an incidence of 55.4% (Gillam *et al.*, 1999). Likewise 57.2% of an Irish general practice population using questionnaires reported the condition (Irwin and McCusker, 1997). Population studies contrast sharply with studies that use clinical diagnoses when the prevalence of the condition falls. For example, Rees and Addy reported that only 201 of 4,841 patients (4.1%) had clinically diagnosed dentine sensitivity (Rees and Addy, 2002). This figure may also be inaccurate as data were collected from different general practices using 19 different examiners. There are no data indicating the level of agreement between examiners and indeed there was a wide variation in estimates between examiners and populations.

When patients perspectives have been sought this has largely been restricted to ratings of pain, usually in response to a stimulus within a clinical setting (Al-Wahadni and Linden, 2002; Fischer *et al.*, 1992; Flynn, 1985; Rees and Addy, 2002.). Unfortunately pain experiences are heavily depend-

ent on personal and environmental factors (Gracely *et al.*, 1978; Tarbet *et al.*, 1980) yet this extensive literature on pain is not integrated into ideas on dentine sensitivity. For example, some pain scales confuse the sensory, affective and timeline aspects of pain in one scale (Nagata *et al.*, 1994; Tarbet *et al.*, 1980) and others almost exclusively measure sensory as opposed to affective pain (Al-Wahadni and Linden, 2002; Wara-aswapati *et al.*, 2005). Other research makes little or no reference to the experience of pain in an everyday context.

Other patient centred research has focussed on the stimuli for pain e.g. cold drinks (Chabanski and Gillam, 1997; Fischer *et al.*, 1992; Flynn J *et al.*, 1985; Gillam *et al.*, 1999). According to this research dentine sensitivity impacted on tooth brushing in 8.7% of cases, 28.2% of participants could not drink cold water without some discomfort, 26.0% could not eat ice cream without discomfort. Likewise 46.6% of participants reported not avoiding the area of discomfort in relation to eating, drinking and cleaning whereas 10.5% would avoid the area of discomfort. All in all patients were unable to complete most day to day activities without undue discomfort. The condition was also described as a low grade issue that often persisted for over five years (Gillam *et al.*, 1999). What is clear from the existing literature is that when patients' experiences and perspectives are sought these views are only sought minimally. Although the everyday impact of sensitivity has been investigated in a limited manner (Gillam *et al.*, 1999) this research made little reference to the burgeoning literature on the impact of oral conditions on everyday life (Locker, 1988; Slade and Spencer, 1994). It seemed that an opportunity existed to explore the everyday impact of the condition from this perspective. As a consequence we aimed to explore the impact of dentine sensitivity on everyday life with reference to psychosocial and functional impacts.

MATERIALS AND METHOD

Participants were purposively recruited from a general population to secure a range of experiences and views about the everyday impact of dentine sensitivity (Sandelowski, 1995). It was intended that sufficient participants would be needed to achieve saturation of information but not so many as to prohibit detailed analysis. We expected to interview 20-30 participants on this premise. Participants were adults experiencing sensitivity in their teeth and were identified through the research team's contacts and through snowball sampling.

During data collection, the research team identified some people who described themselves as having quite severe sensitivity. It is very important to note that these participants were recruited from a snowball sample from the immediate social circle of the researchers. After analysing data from 13 people who described themselves as having 'sensitive teeth' the research team considered where to sample next. The team were aware, from previous commercial research on dentine sensitivity, that some people do not use the term sensitivity, are in fact reluctant to do so but who nonetheless experience the condition. In the interests of getting the full range

of experience and impact of sensitivity on everyday life we purposively sampled a further 10 participants. This group was recruited on the basis that they experienced 'twinges and discomfort' in their teeth. During the interviews we only used the term sensitivity if the participants themselves used it at any point in time.

Participants were phoned or emailed and invited to take part. They were asked about their sensitive teeth, their age and availability for the study. The goal of the study was described in general terms. After this initial approach participants were sent a written information sheet and consent form. They were then called and an interview date arranged at a suitable time. Written consent was obtained on the day of the interview. Interviews lasted from 20-40 minutes and on completion participants were given a small honorarium to thank them for their time. The problem of honorariums in research has been discussed at length in the literature, one of the principle threats being to the voluntarism of the participants (Roberts, 2003). Whilst there is without doubt some truth to this there are several things to consider. First, the condition was described as minor by almost all participants and therefore did not place them under undue pressure to take part. Secondly, the study was non-invasive and so the risk to participants was minimal. Finally, it is important to note that all participants had to respond to a check list of symptoms. It was through this list and the subsequent interview that it became clear that out of the 23 recruited only one participant had been recruited who we could categorically state was not suffering from dentine sensitivity. In this instance the interview demonstrated that the participant was not aware of the difference between dentine sensitivity and dental disease. It was therefore very unlikely, we would suggest, that the honorarium had placed participants under undue pressure. The study was granted ethical and research governance approval from the University of Sheffield Research Ethics Committee.

Interviews began with standard questions that explored the general impact of dentine sensitivity on their lives. The interviewer also used a visual analogue scale rating of the intensity of the pain and elicited stories about the context of pain experiences. Interviewers attempted to be as open as possible to participants' narratives and flexible in switching between interview topics. At times the interviewer would repeat questions to elicit more detailed responses about various aspects of the experience of dentine sensitivity. Interviews were then transcribed as soon as possible after the interviews and the recordings deleted. To preserve anonymity all identifying information was avoided during the interview and any emerging identifying information was removed from the transcripts.

Data analysis

Data were analysed from a framework (Ritchie and Spencer, 1994) induced from the data and informed by the literature on chronic illness (Bury, 1982; Williams, 2000), coping (Lazarus and Folkman, 1984), illness beliefs (Leventhal *et al.*, 1980; Leventhal *et al.*, 1997) along with the general literature on the biopsychosocial impact of oral health. It is important to note

that these findings were to be used to develop items for a questionnaire to measure the impact of dentine sensitivity on everyday life. Data analysis also focussed on detailing the range of impacts associated with the condition.

RESULTS

Twenty three interviews were conducted with 15 females and 8 males. The principal impacts on everyday life were pain, impacts on functional status and everyday activities such as eating, drinking, talking, tooth brushing and social interaction in general. Impacts appeared to be related to a range of individual and environmental influences. These broad variables interacted in complex ways leading to a subtle but complex condition that can have significant impacts on everyday life.

The impact of dentine sensitivity on everyday life

In general, within the pain literature, pain experiences are described as having different qualities along three major dimensions; sensory (e.g. needles), affective (e.g. vicious) and evaluative (e.g. annoying). Indeed sensations can vary according to the types of pain (Melzack, 1973; Melzack, 1993). From the interviews it was clear that the impacts of dentine sensitivity were primarily manifested through pain, described in terms of its duration, frequency, intensity and localisation. The following is a typical account:

"I think so, yeah, fortunately it's not such a strong sensation and it doesn't happen so often that I'm aware of it, but yeah, it's in the molars, both sides" (S1.4.p.1)

For many participants the sensitivity was very unusual, often described as "*sensations*" rather than pain. There was therefore a wide variety of descriptions with 22 different nominalisations including terms like "*brain freeze*", "*nails on a blackboard*" and "*needles*". Whilst the descriptions differed they were commonly characterised as a sharp, stabbing or shooting pain or as a mild twinge. Less frequent terms included tingles or a shivery feeling. For some the word 'pain' as a descriptor sounded a bit too "*harsh*" (S1.4.p.1).

The nature of pain interacted with various triggers (*Figure 1*) for the condition. For example, sensations were described as "*lingering*" or "*itchy*" lasting sometimes for 20 minutes as a reaction to consuming sweet things and chocolate. In contrast with cold foods (ice-cream, lollies) and cold air the sensation tended to be more intense, lasting only a few seconds. On some occasions the sensations were said to have lasted for full days especially after recent dental treatment. Interestingly, cold foods and drinks caused more often than not the corresponding feeling of "*freezing*": "*you feel it's very cold, it's frozen and then it's gone*" (S1.22.p.6). Physical triggers including running one's tongue over the teeth or vigorous tooth brushing were also reported to initiate the sensations. In most cases, however, the sensation was sudden and instant, difficult to predict or be prepared for. In a few cases, participants reported the sensitivity to two or three triggers.

Despite some cautiousness to label the sensation 'pain', all interviewees registered a mark on a visual analogue pain scale. The intensity of pain was most commonly rated as 3-4

Figure 1. The triggers associated with the everyday manifestation of dentine sensitivity

- Foods: ice-cream, ice-lollies, honey, sugar, chocolate, crisps, cereals, pineapple, cold fruit, apple, melon, grapes, sorbet
- Drinks: cold lemonade, fizzy, hot tea and coffee
- Physical pressures: tooth brushing, flossing, scale and polish, tongue touches, metal touches
- Cold air when breathing and at dentist, cold water when rinsing
- Whitening toothpastes

out of 10. It appeared that the intensity varied depending on the trigger such as the temperature of foods or drinks; colder (frozen) and hotter things caused more intense sensations. Triggers of different quality were also rated differently:

"If it is cold while I'm eating melon or warm tea that's probably about six on a scale of one to ten. If it's after grinding you'd probably get close to a ten depending on a severity of what has happened" (S1.5.p.3)

Caution should therefore be taken when obtaining pain ratings in clinical settings, the triggers interact to give a complex and subtle experience of pain in everyday life. This is in keeping with the psychological literature where anticipation of a high intensity pain will result in high intensity ratings regardless of the intensity of the stimulus (Ploghaus *et al.*, 2001). So, in the previous quotation it is not hard to see how pain ratings for sensitivity can vary dramatically according to context.

The common approach to measuring the intensity of pain in the dental literature, measures only one component of the overall experience. Ignoring the sensory and affective components will restrict our understanding of the condition (Fernandez and Turk, 1992; Melzack, 1973). This is important as these components are related to the everyday experience of sensitivity. So for example, recent research using an idiographic technique (involving capturing individuals' experiences as they occur in their natural environment) found that sensory and affective components together with activity limitations were related to the intensity of the pain. This relationship was non-linear. It appeared that sensory characteristics of pain were related to higher levels of intensity whereas affective qualities of pain were associated with low intensity pain (Litcher-Kelly *et al.*, 2004). At this stage it is clear that we need to know more about each of these aspects of pain and how they relate to varied experiences in relation to dentine sensitivity.

The frequency of the pain was an important aspect of the condition but did not appear to predict its severity. The frequency of the episodes ranged from having sensations over some periods to fluctuations within a particular (most recent) period. Those who suffered sensitivity for over 5-10 years discussed the frequency of episodes with respect to different sensitivity treatments and also, life circumstances (living in another country, family changes, etc). The condition was also described as periodic and cyclical:

"It comes in cycles so at the moment I've not had it in some time but if they are that way out then it might happen two-three times a week or more" (S1.11.p.2)

Participants could not provide a clear explanation for this periodicity. Biological, personal and environmental factors could explain the fluctuating nature of dentine hypersensitivity. The condition appears to have many similar characteristics associated with chronic headaches (Houle *et al.*, 2005). Yet many questions remain. What, for example, determines the severity of impact of dentine sensitivity? Is it the frequency, severity or unpredictability with which it is experienced most predictive of its severity?

Predictability

"Last night I went for dinner at Phil and Christine's and she has defrosted a cheesecake and it was still cold. It was defrosted but still very cold and I remember just looking out the corner of my eye to make sure no one sees me because I get very self conscious" (S1.9.p.9).

The predictability of the sensitivity episodes was a central feature of the impact of the condition. Awareness of the potential pain constituted an impact in itself. Accounts provided a range of experiences from indifference to strong anticipation of the sensations. One factor regarding anticipation and predictability appeared to be the length of time the individual had been suffering from the condition. In social science the term used to describe this feature of illness is called the illness career. Those who suffered problems for years had often become conditioned to it:

"I am always aware of the potential problem" (S1.3.p.7)

"I do have to think twice before having something" (S1.12.p.6)

In contrasting accounts some people did not anticipate possible pain while eating or drinking. In such cases participants' teeth had developed sensitivity fairly recently and the sensations were not as intense: *"No, no, I don't think that my teeth will be sensitive, no"* (S 1.23.p.5). The feelings could take them by surprise:

"It was like 'oh!' I did not expect it and that's why he [boyfriend] was like 'what's wrong?' and I was like 'my teeth just hurt a bit really' and that was all really" (S1.16.p.7).

"I get cross with myself because I am like 'you know that's going to set your teeth off why did you do that?'... 'Why did you leave that in the fridge?'" (S1.7.p.7)

These participants did not expect the pain. The narratives were more involved, complex and accounted for delicate nuances such as the knowledge of how the sensations in their teeth were likely to initiate and escalate during exposure to triggers: *"I just flinch a bit, I know it is coming"* (S1.7.p.7). Such a need to predict pain could become a mental strain, over a longer period than just when encountering

triggers. The overall impact of the condition may therefore be more profound for the chronic sufferers than for the recently affected:

"You never forget that you have it because the decisions you make and the way you do things is affected by it" (S1.6.p.8)

Constant awareness and an illness career suggest that sensitivity shares characteristics with some chronic illnesses. Living with sensitive teeth requires developing adjustment mechanisms and integrating sensitivity into the context of everyday life (see below). Control (actual or perceived) over the management of pain is linked to lower pain ratings (Miller, 1980), less disability, greater well-being and better coping with chronic pain (Harkapaa, 1991). There are two parts to predictability: knowing the conditions under which the event will take shape and what that event is going to be like (Miller, 1980). If the event is predictable then there tends to be less surprise and anxiety which in turn may lead to less pain reactivity (Bolles *et al.*, 1980). In contrast to this, unpredictable events can lead to anxiety and increased vigilance which can in turn increase sensory receptivity (Rhudy *et al.*, 2000). Unpredictable pain has been related to increased ratings of anxiety and negative valence (Carlsson *et al.*, 2006). One interesting point worth considering is whether 'generalised hypervigilance' (Lautenbacher and Rollman, 1999), which involves increased sensitivity to a range of stimuli usually resulting in increased monitoring of the environment, can become established in dentine sensitivity. What we can see in these data is that for some people the pain is unpredictable and for others it is predictable. The main factor that appeared to be related to predictability was the length of the illness career. For some this was a long term illness with predictable consequences whereas for others it was a health condition that caught them by surprise. These different frameworks warrant further exploration.

Emotional impact

Annoyance was a reaction to the inconvenience and discomfort caused by the sensitivity. However, several patterns were found in participants' accounts. The first kind of annoyance related to the unexpected nature of the pain: *"I wince, like oww, oww, oww and it sort of lasts for quite a few seconds so it is really annoying"* (S1.9.p.1). An annoyance of a second kind arose from a reduced ability to enjoy food:

"It is annoying, it is annoying, and it feels like I am not getting the full benefit, I am not enjoying food like probably other people who haven't got sensitive teeth" (S1.19.p.5).

Likewise, participants reported being frustrated because the sensations were 'spoiling' their pleasure. In other words they were frustrated at the restriction which sensitivity posed to them in their everyday life.

The third kind of annoyance, apparent in a few accounts, connected to the necessity to deploy coping strategies, changing the way they ate and drank: *"I try not to chew in that area, which is a bit annoying"* (S1.10.p.1). Moreover, there was an understanding among the participants that some adjustments could be damaging and unhealthy:

"I just sort of swallow it, it sort of feel, it is going down but as I say

it is just frustrating as I feel I should not be eating all this and it is not helping digestion" (S1.12.p.8).

Annoyance was a subsequent affective reaction to sensitivity. In this sense the data tend to indicate a pattern of emotional reaction, which has also been highlighted in clinical studies of dentine sensitivity (Gillam, 1997). Annoyance gained the highest score on a scale of unpleasantness of pain (Duncan *et al.*, 1989), comparing with unpleasant, disagreeable, distressing and intolerable characteristics of sensitivity pain. Our data, however, allow a deeper insight into why the terms 'annoying' and 'annoyance' were common. It is often because the pain is unexpected and 'out of control' and together with the various techniques of adaption appeared to reduce the enjoyment and natural course of eating.

A fourth annoyance was associated with guilt of eating things they believe they should not have eaten: *"Oh God, I have eaten ice-cream and I shouldn't have done"* (S1.5.p.4). Sometimes participants reported anger for doing this. Some participants described feeling full of self-reproach and guilt for not being able to look after their teeth properly. During episodes of sensitivity participants recalled having forgotten to use fluoride and/or sensitivity toothpaste or having failed to floss appropriately. There were also accounts of omissions in their diet and smoking as contributors to an increasing sensitivity in their teeth. Other times participants referred to earlier periods, usually when they were teenagers, when they overlooked their oral health and somehow contributed to their current problems.

"I wish I'd looked after my teeth better and I think 'why don't I go to the dentist', so I do get annoyed but it is mainly with myself" (S1.9.p.4).

Therefore, the emotional impact of dentine sensitivity is directly linked to the major distressing factor of the oral condition – pain, its unpredictability and detrimental effect on natural and supposedly pleasant daily routines of food consumption. Affective evaluation of physical pain occurs simultaneously or soon after sensitivity episodes, in bringing mind and body, invoking 'displeasure, anxiety, sadness and anger that are fully emotional' (Leder, 1984).

Functional impact

The functional impact reported by participants included restrictions in performing everyday tasks such as eating, drinking, looking after their teeth, being outside on a cold and windy day and some sporting activities. Importantly these restrictions were described in conjunction with adjustment mechanisms, i.e. coping. Separating these two things in the data was very difficult:

"I was making this honey and apples for my daughters and it was clear runny honey and I was really looking forward to eating it and I couldn't at that point, you know, the pain was I wouldn't call it unbearable but it was a put off, it put me off" (S1.3.p.7)

In the case above the sensitivity reduced the pleasure of eating and forced the participant to omit the meal. Others reported sensitive teeth taking a lot of enjoyment out of food. For example, they disliked having to eat food at room temperature when cooled things tasted nicer; they also disliked

having to select foods which were “easier to eat” and modifying the ways they ate:

“It is not as enjoyable, because I find myself chewing on one side and avoiding chewing on the left side so that’s not particularly a nice thing” (S1.10.p.4).

Maintaining oral hygiene could also be troublesome. Tooth brushing and rinsing with cold water often caused unpleasant sensations. Although there were no accounts of stopping oral hygiene practices, some participants dealt with it by buying an electric toothbrush, moving water around their mouth and other adjustments.

Finally, physical activities such as exercising outside or just being out on a cold and windy day, were restricted: *“I have to keep my mouth shut; the weather can affect my teeth as well”* (S1.19.p.2). Occasionally, there were responses like the following: *“I struggle when I am skiing”* (S1.16.p.5), or *“when I am swimming I try and keep my mouth shut”* (S1.5.p.10). Indirectly, this affected social functioning as occasionally it necessitated keeping one’s mouth closed and prevented people from talking.

The data demonstrated that functional limitations associated with dentine sensitivity in some cases could be insignificant or severe; restricting or depriving respondents from activities like eating and drinking. Distal symptoms (Armstrong *et al.*, 2007) associated with dentine sensitivity could radiate out from the body into the everyday world, but might not necessarily be disabling or debilitating. However some impact on daily living was noticeable for some interviewees.

Social impact

Sensitivity also impacted on the social activities of some participants, although others did not notice any differences. This impact was indirect and mostly concerned situations where participants ate socially. Going out for a meal with others presented problems for some.

“I am just aware it’s painful, occasionally, if I am in company I will shut off from the conversation so I miss sometimes what people are talking about... But during that minute you could miss something quite vital like that people are talking about and then you are peddling, back-peddling trying to catch up. Especially if it is a quick conversation or there is a debate going on and you just miss” (S1.5.p.6,12).

This exclusion from a conversation is as distressing as the pain itself. This participant had another difficulty:

“If it comes [food] and it is too warm or too cold I have to wait which invariably means I delay everybody else at the table as I finish last. Or I end up only eating half the meal because everybody has finished and I am conscious of holding everybody else up” (S1.5.p.9).

Thus the sensitivity led to a violation of etiquette. Moreover such impacts could cause further embarrassment when the problem was exposed:

“I am polite and cover it up or I take ages to eat it till it is warmed up a bit or do the funny thing with my teeth while nobody’s looking” (S1.6.p.8).

Such modifications had to be hidden, as supported by another account of a respondent who went out for a drink with their friends:

“They bring me a drink from the bar, they always put ice in and I hate ice. If nobody’s looking I scoop it out” (S1.14.p.7).

The last two accounts indicate a taboo on discussing dentine sensitivity, although this varied, with some people not sharing it because it was a problem not worth worrying about.

Coping with dentine sensitivity

The adaptation strategies of people with sensitive teeth varied dramatically. For participants experiencing the condition over years, techniques of adjustment to sensitivity were often complex. All coping strategies could be subsumed into three major categories: avoidance coping, approach coping and tolerating. Coping is typically about managing or minimising a situation or threat. Approach coping includes information seeking, problem solving, seeking social support. Whereas avoidance coping may involve cognitive (e.g. denial, distraction, wishful thinking) and/or behavioural strategies (e.g. behavioural disengagement). Tolerating is something that we generated from the data as a form of ‘emotion-focussed’ coping as a strategy it appeared to overlap with both approach and avoidance based coping.

Avoidance coping appeared to be quite common with participants reporting that they avoided cold drinks, frozen fruit, ice cubes and ice-cream than cold/hot/sweet food:

“I just try to avoid having ice, too much ice in my drinks and you just sort of learn not to have things that set it off really and a bit like ice-cream, I will have the odd one” (S1.7.p.2).

Occasionally, avoidance of hot drinks was mentioned: *“I would rather have a cup of cool coffee, so it is such an unpleasant pain, I am consciously avoiding it”* (S1.2.p.3). The boundary between avoidance and approach coping was flexible. Participants might go outside and eat some foods, using other, active techniques of coping. In this respect there was some approach coping. Two strategies were apparent: modifying of food and modifying the ways food/drinks were consumed.

Changes in the ways food was consumed involved adjusting techniques of avoiding contacts with certain teeth, and specially developed ways of melting, chewing, biting, sucking, licking and drinking. Participants minimised contact with affected teeth by moving food and drinks to another side of the mouth: *“I try not to eat on that side of the mouth”* (S1.3.p.4). Similar habits were developed for drinking: *“I am conscious and don’t let the drink go into that area”* (S1.10.p.1), other participants used straws for the same reasons. Special techniques were invented for eating ice-cream, like biting in small pieces, avoiding chewing, melting in the mouth, sucking, licking and using a spoon. Sensitivity to sticky food sometimes forced participants to lick the area affected or even use fingers to clear it up:

“With sticky foods like say I have currants on my cereal things like that, I am making sure all the time that I haven’t got any food stuck on that level of my tooth because like I said I move some food with my finger” (S1.4.p.2).

Such strategies (i.e. guarding body parts) have been described in the literature as initially adaptive. But these strategies may, over time, become maladaptive (Tan *et al.*, 2001).

Food modification as an approach coping strategy included warming or cooling foods/drinks. In most instances, bringing food up or down to room temperature was enough to cease negative effects on sensitive teeth. However, at times participants used more drastic measures like putting ice-cream in a microwave *“to take a chill out of it”, holding the offending area with a finger or using other agents to neutralise the unpleasant sensation: “a bit of chewing gum”* (S1.12.p.6). Typically, participants were leaving cold things to warm up.

Meanwhile, some accounts described ‘accepting’ foods and things that affected the teeth. Participants with recent experiences of sensitivity were often indifferent to the episodes. Some did not do anything to avoid or protect their teeth because the sensation was fairly insignificant and cancelled by feelings of pleasure or comfort of eating. One respondent admitted:

“I just get used to it by then, my teeth kind of like get used to it, after a few mouthfuls I am ok. That’s why I just persevere with it really” (S1.16.p.9).

These accounts of reactions or tolerating the pain indicated that the impact of dentine sensitivity on everyday life can be restricted. Such restrictions are important and need to be considered, in relation to how long someone has had the condition. Acceptance can also determine functional status and impairment in chronic pain where control beliefs and active coping are related to more positive mood (Esteve *et al.*, 2007). Acceptance is an important factor in avoiding disability and maintaining function.

Whilst some coping prevented impacts from specific episodes of pain, other coping strategies were aimed at overall management of sensitivity. There was a continuum between active or approach coping and a passive stoicism or avoidance coping strategies. Finally, like many other chronic conditions, a stoic approach was also apparent in some of the responses. Typical responses were a refrain of ‘just put up with it’ : *“Just try and get through it really”* (S1.10.p.3), *“we have been taught to get on with things... don’t make a fuss”* (S1.5.p.10). Stoicism as a strategy of control and the choice to tolerate the pain connects with other explanatory ideas in the model of sensitivity. The next two sections on illness beliefs and identity add some detail to this issue.

Illness beliefs

Illness beliefs summarise peoples’ ideas about their condition, its causes, manifestations and an evaluation of its impact. A range of social and cognitive variables have been linked to functional limitations in other conditions (Jensen *et al.*, 2001). In addition, strong beliefs in the chronicity of a condition, negative consequences of the condition and avoidance coping styles are associated with poorer physical and psychological outcomes (Hagger and Orbell, 2003). Such beliefs form an important part of the explanation of variations in the response to different health conditions and their impact. In this respect there was a contrast between those who experienced sensitivity as a relatively new experience of mild discomfort compared with those for whom it was a more serious problem that had significant impact over a longer

period of time. In the literature on illness beliefs people who believe they are disabled by their pain feel damaged in some way and avoid certain activities. Such conditions increase impacts on daily living. This difference was reflected in narratives of the onset of the condition. Some had accounts of when they began getting sensitivity whereas others had no specific memories. Indeed, there were no specific accounts of a single event which caused sensitivity other than a reference to a specific time period.

“I can remember being at umm secondary school and not being able to eat ice-cream umm having the most terrific headaches if I ate ice-cream, shooting pains at the front of my face. Err... so probably as far back as then... Many years yeah and then during pregnancy things got worse umm and then obviously as I have got older things have got worse because my gums have receded” (S1.5.p.2).

This story places sensitivity into the context of the respondent’s life in conjunction with other life events and their health status. Certain life events were linked to increased sensitivity. Other participants, with recent onset, were less certain about when and why it had started. This either indicated that their sensitivity had a low intensity or that they as yet had a relatively unelaborated view of the condition. It was a characteristic of many accounts that only approximations could be given: ‘for a few months’, ‘few years’, etc. One participant with a recent history of sensitivity admitted:

“I would say within the last few months I’ve been aware of it but I would say that actually it’s something, it’s something that I’ve had for long time but I’ve not thought about it as much and therefore it’s not been as much of an issue” (S1.4.p.3).

Knowledge of the condition varied between participants. Some sought detailed information from different sources, whereas others retained a relatively superficial knowledge and were largely unaware of the causes and prognosis of the condition. Once more this difference appeared to be governed by the degree to which people either saw the condition as an established fact of life or as something transitory. Participants who saw it as a condition worthy of some investigation appeared to utilise three major sources of information: *“what I’ve heard from the dentist and what I’ve seen on tv and on the back of the toothpastes packet”* (S1.9.p.4). In some instances the internet was an obvious source of information.

The expertise of such accounts contrasted with accounts of little knowledge or interest in getting more information. Why this was the case is not easily explained since the relative indifference to the causes of the condition was present in observations of chronic sufferers as well as participants new to the problem.

“I don’t really know anything about where it comes from or why it happens. You think that I would have probably questioned that but I suppose it is just something I’ve got used to” (S1.19.p.5).

Observations such as these demonstrated how a lay understanding of sensitivity emerged through a complex mixture of expert knowledge, the internet and advertising. It also demonstrated how lay beliefs could become relatively undifferentiated. For example, contrary to clinical diagnosis the condition was often placed by participants in the overall context of oral health and ageing.

THE EVERYDAY IMPACT OF DENTINE SENSITIVITY

"Perhaps, just as your teeth get older, your gums perhaps aren't as good as when you were younger" (S1.14.p.1).

For those who linked the condition to the state of the gums, teeth and oral health in general, sensitivity became one of many relatively small but niggling worries about their health. These small things add up and caused considerable worry for some participants: *"I'm consciously worried about why; the reasons behind my sensitivity cause me anxiety" (S1.4.p.7).*

"I think the long term it worries me if they get worse and I suppose with the gum problem as well that worries me so it's the two together" (S1.7.p.7).

Others, for whom pain and trouble over the years was more significant tended to rate the impact as negative but relatively non-problematic. Some anxiety, however, was expressed in relation to the long-term prognosis. The potential psychosocial impact was clearly marked in one interview:

"Its not bothering me too much at this stage, if it was a case of there's nothing we can do you're going to have to live with this for the rest of your life then if it might present more of a psychological problem for me" (S1.10.p.5).

Sometimes the situation of the interview provoked reflections on the meaning of the sensitivity for their general health and well-being. Research in the sociology of health and illness has suggested that narratives could be understood as a story telling activity which inspires reflexivity in making sense of health-related events. As the interview proceeded some participants reported changing the way they observed the condition. An account of the respondent who initially declined the idea of sensitivity impacting on his life exemplified such changes:

"It changed my eating habits as I told and about my teeth, the way I am thinking about them maybe it changed, maybe I have a pain and I think about the future and think something will happen to them. It made me think this way" (S1.22.p.10).

CONCLUSIONS

Dentine sensitivity was experienced in complex ways in everyday life. Whilst the professional definition of dentine sensitivity is that it is a "short, sharp pain ...in response to stimuli typically thermal, evaporative, tactile, osmotic or chemical ..." (Holland *et al.*, 1997; Orchardson and Gillam, 2006). Our data suggest those affected have a complex experience with a wide variety of triggers and responses. The sensations were not readily described as 'pain'. Although participants did rate the level of pain they were experiencing this was more a result of being asked directly to do so, not because this is how they described the sensations. This links with previous work in the pain literature (Melzack, 1973; 1993) which describe that pain experiences have different qualities along three major dimensions; sensory (e.g. needles), affective (e.g. vicious) and evaluative (e.g. annoying). These sensations differ according to different types of pain, whether acute versus chronic and, of course, across people due to a number of social, cultural and individual characteristics.

Physical contact during tooth brushing, flossing and scal-

ing and cold air could all trigger sensations. Many of these stimuli are already recognised in the dentine sensitivity literature. What is not recognised is that these stimuli along with the situations within which they are experienced can have affective impacts on everyday life. Therefore, whilst the level of the pain associated with the sensations was often described to us as minor (mostly around a three or four on a scale of one to ten) they were nonetheless associated with significant impacts.

A common way of measuring dentine sensitivity has been through the use of visual analogue scales in clinical situations (Coleman and Kinderknecht, 2000). Whilst this form of measurement is standardised it belies the fact that responses are heavily modified by the context in which measurement occurs. Although there is some recognition that the descriptors being used can affect ratings (Tammamaro *et al.*, 1997) there have been few attempts to explore the affective impact of dentine sensitive pain from the perspective of a science of everyday life.

The findings of this study confirm that further research into the everyday nature of dentine sensitive pain would be beneficial. Our data connect to the psychological literature on pain experience with several points requiring further explanation and research. First, it is apparent that there are sensory and affective components of pain and that these interact in non-linear ways. As yet we do not have enough detailed data on dentine sensitivity to tell us more about these aspects of the condition. Secondly, elements of predictability and control are associated with the pain of dentine sensitivity. In this respect the length of a person's illness career appears to be related to its predictability, whether or not this translates into lower pain ratings remains the subject of further work. Finally, it appears that acceptance of a chronic condition is an important predictor of outcome in relation to functional status we do not know how this affects the outcome of dentine sensitivity. It seems that there is a distinction between those who suffer the condition very much within the framework as a chronic illness and those who see it as a set of problems associated with a normal healthy life.

The psychological literature makes a careful distinction between health and illness cognitions. On the one hand health is seen as not being ill, as a reserve of mental and physical strength and as being in equilibrium (Blaxter, 1990; Herzlich, 1973). Illness on the other hand involves not feeling normal, having specific symptoms of a specific condition, seeking to identify consequences about what can and cannot be done, a time line for illness and finally experiencing an absence of health (Leventhal *et al.*, 1980; 1997). Clearly from these data it is difficult to separate responses into exclusively a health or illness framework since the experience of sensitivity links to both frameworks. Dentine sensitivity does not appear to have any form of major physical crisis associated with it (Moos and Schaefer, 1984). Dental disease and its effects are often ubiquitous features of everyday life. It seems that participants had some difficulty in establishing whether or not they were suffering from an illness. When dentine sensitivity was experienced within what seemed to

be an illness framework there seemed to be some support for Leventhal *et al.*'s (Leventhal *et al.*, 1980; 1997) self regulatory model of illness cognitions.

Finally, these data also suggest that what is required is a biopsychosocial understanding of the pain of dentine sensitivity that recognises the centrality of the biological but that the actual experience of pain is going to be dependent on psychological (illness beliefs, coping) and social components. This paper has focused on the psychological and personal factors. Further work will elaborate the social aspects of the condition. Clearly an increased understanding of the contribution of these psychological and social variables to a person's daily experience of dentine sensitivity will help broaden the research agenda and improve our theoretical understanding of the treatment of the condition.

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