CLINICAL ORAL SCIENCE AND DENTISTRY

REVIEW ARTICLE Open Access

The Impact of Dentine Hypersensitivity on the Quality of Life: An Overview

David G Gillam*

Oral Bioengineering Institute of Dentistry Barts and the London School of Medicine and Dentistry QMUL, London EA1 2AD, UK.

Received date: February 08, 2021, **Accepted date:** February 16, 2021, **Published date:** February 24, 2021

***Corresponding Author:** David G Gillam, Oral Bioengineering Institute of Dentistry Barts and the London School of Medicine and Dentistry QMUL, London EA1 2AD, UK.

Abstract

DH is a recognised clinical condition that is somewhat enigmatic in nature and impacts on the QoL of those who suffer from the problem. It is therefore imperative that dental professionals not only identify and diagnose DH, but also be aware of the impact of DH on their patients' QoL during their day-to day activities.

Keywords: Dentine Hypersensitivity, Quality of Life.

Introduction

Dentine Hypersensitivity (DH) is reported to affect at least one in ten individuals in the general population and may also impact on the quality of life (QoL) of those who suffer from the problem [1-2]. From a clinical perspective the pain generally results from drinking hot and cold food and drink although cold drinks or air may be the predominant factor in causing this pain in individuals with exposed root surfaces of their teeth. The pain associated with DH has been described as 'rapid in onset, sharp in character and transient in nature', and will resolve once the offending stimulus has been removed [3].

The mechanism underpinning DH is hydrodynamic in nature and based on the Hydrodynamic Theory where minute fluid shifts in the dentinal tubules initiates a pain response and as such current treatment approaches are either by recommending an In-office (professionally applied) and/or an over-the-counter (OTC) product depending on the extent and severity of the clinical problem [4-5]. The treatment of DH is based on a thorough medical and dental history together with a clinical examination leading to a definitive diagnosis based on these findings. The clinical examination will often involve the dental professional asking the patient several questions to ascertain the site of the discomfort, how often does it occur, is it transient in nature (does the pain resolve when the stimulus causing the pain is removed) as well as determining the severity of the pain using pain scales (e.g., a 0-10 numerical scale or verbal scoring system) [5].

Once the dental professional has determined the diagnosis a management plan is proposed depending on the extent and severity of the problem. This may involve providing the patient with OTC toothpastes for a mild-moderate discomfort or applying an In-office (professionally applied) product such as a fluoride varnish together with advice on avoiding cold drinks,

avoiding over enthusiastic toothbrushing etc. Health-Related Quality of Life (HRQol)/ Oral Health Related Quality of Life (OHRQoL) measures have been previously used to determine the impact of oral conditions such as tooth loss, periodontal disease and dental caries as well as using QoL questionnaires such as the Oral Health Impact Profile (OHIP-14) and Geriatric Oral Health Assessment Index (GOHAI) questionnaire [6-11].

Until recently however, investigators did not consider the effect of DH on the QoL of those individuals on a day- to-day basis using QoL measures such as the Oral Health Impact Profile (OHIP-14 or OHIP-49) or the dentine hypersensitivity experience questionnaire (DHEQ) [12-29]. The aim of this short overview is to update dental professionals on the impact of dentine hypersensitivity (DH) on the QoL of those suffering from this troublesome clinical condition.

The difficulties in determining the cause of dental pain

According to Gillam [1] one of the difficulties in determining a definitive diagnosis in patients complaining of dental pain is the vast variation in the clinical conditions that may elicit the same clinical symptoms as DH. These different clinical symptoms need to be eliminated before a differential diagnosis is formulated. It is also important to note that patients complaining of oro-facial pain such as toothache or DH may have associated physical, psychological (including mood), or emotional features which include a sense of despair or helplessness and frustration of being unable to cope with their situation [11, 30].

These patients can be both apprehensive and anxious when attending the dental office and it is therefore important for the dental professional to be sympathetic to their problem and try to conduct the examination in a calming manner using all their skills to obtain the relevant information regarding the aetiology of any predisposing factors (such as erosion, gingival recession etc) and clinical symptoms associated with the patient's problem. This should include undertaking a thorough medical and dental history (including a dietary history) together with a clinical examination which may also include investigative procedures such as pulp vitality testing and radiographs prior to formulating a definite diagnosis.

It should be noted however that some of these procedures such as air from a dental air syringe or cold water, may be initiate a similar discomfort to their current pain and the dental professional therefore needs to guide patients through these procedures by carefully explaining what they may experience during the evaluation.

Further information regarding 1) the type of stimulus initiating the pain (hot/cold food and drinks, cold air etc), 2) the site of the discomfort, 3) how often does it occur, and 4) is it transient in nature (for example, does the pain resolve when the stimulus causing the pain is removed) can be ascertained by asking the patient. The use of pain scales (0-10 numerical scale, verbal scores) may also help the dental profession to determine the severity of pain [5]. Once the dental professional is confident of a differential diagnosis then he/she can recommend a suitable management strategy for resolving the patient's discomfort, for example 1) for mild to moderate generalised sensitivity, a desensitising toothpaste and 2) for moderate to severe localised sensitivity, professionally applied varnishes, glass ionomer cements (GICs) may be recommended (31).

According to several papers outlining guidelines for the management for DH, it was recommended that the diagnosis should be based on the presenting clinical features and a thorough medical and dental history [5, 32]. Furthermore, if the patient has had recent dental treatment such as non-surgical or surgical periodontal treatment or tooth whitening procedures then this may help the dental professional to correctly identify the problem as post-operative sensitivity and provide reassurance to the patient that the discomfort will resolve (in most cases) within a week of treatment as well as recommending the relevant treatment such as a varnish, desensitising toothpaste, or mouthwash [33-35]. It should be acknowledged however, that simply providing a toothpaste/mouthwash or professionally applied product without firstly removing the aetiological or predisposing factures that initiated the problem will not resolve the issue in the long-term [5, 32, 36].

The subsequent management of the patient's condition would therefore involve a maintenance programme where any improvement or worsening of the condition can be monitored. It is imperative that the patient takes ownership of their own oral health care and initiate any behavioural changes that have been recommended by the dental professional such as modifying an over-zealous brushing technique or dietary changes to reduce the consumption of acidic food and drinks such as apple juice and white wine. Such changes to a patient's lifestyle may however take time and is usually unsuccessful after one visit and may therefore require several visits over time before any improvements may be effective and improve the patient's QoL by reducing the impact of DH [37].

The importance of professional oral care (such as periodontal treatment and/or providing desensitising toothpastes), oral health, and self-care education and its impact on improving QoL has also been highlighted in the published literature [5, 11, 17, 28-29, 32, 37].

Recognizing the impact of DH on the QoL

One of the problems facing investigators when evaluating the actual impact of DH on the QoL is the differences between the patient's and dental professional's perception on the extent and severity of the problem. For example, questionnaire studies generally indicate a higher prevalence of DH than studies that

include a clinical examination which tend to have lower prevalence figures [38-42].

However, the true prevalence of DH may be underreported for several reasons, 1) the discomfort experienced by individuals has been reported to be transient in nature and as such individuals may either self-treat using desensitizing toothpastes or simply not inform their dentist when attending for treatment and 2) dental professionals may not routinely examine their patients for the problem unless prompted to do so by their patients [3]. There is also disagreement about the true extent of the impact of DH on the individual's QoL based on the results from simple questionnaire studies [39-40, 43-47] and those studies using QoL questionnaires (patient based) [12, 15, 17, 20, 25, 29].

The outcome from these different studies would suggest that the impact on DH on the QoL is more severe in QoL questionnaire studies compared to simple questionnaire studies from the dental professionals' perception where the impact of DH on the QoL is considered only moderate in nature [43-47]. There is no doubt from these studies that patients with DH do experience discomfort from eating, drinking, or brushing their teeth during their day-to-day activities and depending on the severity of the problem may cause them to adapt and often modify their lifestyle [12-13). For example, patients may use coping strategies by either drinking on the opposite side of the mouth or simply avoid taking cold food and drinks completely. These symptoms may be both unpleasant and painful and as such are highly relevant from the patient's perspective and may adversely impact on their QoL. Dental procedures may also be unpleasant for patients with DH, for example non-surgical (scaling and debriding/polishing teeth) or surgical periodontal procedures, thermal evaluation with the air syringe, rinsing out with cold water from a mouthwash or suction when keeping the mouth dry during these procedures.

It should be recognized that these procedures can be considered stressful by the patient and may therefore increase the anxiety that they are already experiencing. The patient may however be reassured that any symptoms from these dental procedures may be transient and will resolve within one week [33-35, 38-40, 42], The application of a desensitising polishing paste or varnish together with a recommended desensitising toothpaste or mouthwash for home use would be suitable to alleviate any discomfort in the first few days.

The use of QoL questionnaires such as the OHIP or DHEQ have been used in several clinical studies to determine the impact of DH on the patient's QoL [12, 15, 17, 19- 29] and these questionnaires have been validated for use in different population groups [21-25]. They have also been used to evaluate either the effects of periodontal treatment or the effectiveness of a desensitising treatment such as a toothpaste [16-17, 20, 25, 28-29].

For many dental professionals, however the use of these questionnaires may be too time consuming in general practice, although the shortened form of the DHEQ may be utilised in general practice. The use of a simple short questionnaire asking a series of questions relating to a patient's daily activity may also provide the dental professional with a similar understanding of the impact of DH.

For example, one may simply ask which of these following activities can you do/cannot do during your daily routine? 1) brush your teeth, 2) use a mouthwash 3) eat/drink hot/cold food and drink etc. This type of questionnaire has been used in several studies and has provided a degree of understanding of the impact of DH in daily activities [39-40]. For example, the questionnaire study by Gillam et al. [40] reported that patients were unable to complete the following daily activities without some discomfort namely: 1) drinking ice-cold water (24%), 2) eating ice cream (22%0, 3) eating sweet things (13%), 4) drinking hot drinks (7%), 5) brushing their teeth (7%), and 6) eating hot meals (4%). These figures compare reasonably favourably to the results from a QoL questionnaire by Gibson et al. [15] who reported that patients were unable to undertake the following activities without some discomfort: 1) drinking cold water (28.2%), 2) eating ice-cream (26.5%) and 3) brushing their teeth (8.7%).

It is however important to acknowledge that any lifestyle factors that have been identified by the dental professional as having an impact on the patient's QoL, should be modified to reduce any further damage to the tooth surface and reduce the impact of DH on the patient's QoL. This could involve providing information of changing or modifying the diet to reduce the impact of erosion from acidic food and drink, modifying the toothbrush technique to minimise further damage to the tooth surface. The provision of a suitable desensitising toothpaste for mild-moderate sensitivity or the provision of a professionally applied varnish for a localised area of sensitivity may be recommended prior to leaving the dental practice. Ideally the patient should be monitored for several visits to determine whether the recommended treatment has been beneficial by reducing the impact of DH on the patient's QoL [5, 32, 36].

Realistically, however, it is important to manage both the dental professional and patient's expectations of the complete resolution of the problem. It is therefore reasonable to expect that if the treatment is partially successful (together with any coping mechanisms) then this will enable the patient to minimise the effects of the daily activities on their QoL thereby enjoying an improved QoL. The importance of continuing professional oral care, together with the relevant information on maintaining good oral health (including recommendations on dietary intake and modification of any overzealous toothbrushing techniques) with an emphasis on giving the patient ownership of their oral care is essential to reduce the impact of DH and improve the patient's QoL [5, 32, 36-37].

Summary and Conclusions

DH is a recognised clinical condition that is somewhat enigmatic in nature and impacts on the QoL of those who suffer from the problem. It is therefore imperative that dental professionals not only identify and diagnose DH, but also be aware of the impact of DH on their patients' QoL during their day-to day activities.

One of the problems facing investigators when evaluating the actual impact of DH on the QoL is the differences between the patient's and dental professional's perception on the extent and severity of the problem. This is particularly relevant when comparing the simple questionnaire studies with the QoL questionnaire studies (patient/person centred) where the impact of DH on the individual's QoL was considered have a severe impact on their QoL, compared to the perception of dental professionals where the impact of DH was considered moderate in nature. These QoL questionnaires, may however be relevant in assessing the impact of interventions such as desensitising toothpastes in clinical studies to reduce the impact of DH on the individual's QoL [28-29].

According to the systematic review by Douglas-de-Oliveira et al. [29] although the studies included in their review indicated a reduction in DH with an improvement in the QoL (OHRQoL) following treatment, nevertheless these investigators considered the evidence from these studies to be of very low or moderate methodological quality.

The dental professional should also be aware that dental procedures may also be unpleasant for patients with DH and may cause considerable stress to an already anxious patient. It is therefore important to alleviate this stress whenever possible by providing the relevant information about the various procedures in a relaxed and reassuring manner. The use of a local anesthetic for non-surgical procedures may also be beneficial to some patients who may be apprehensive about the treatment. It is also important to remind the patient that these procedures may cause some discomfort following the dental visit. The application of a desensitizing polishing paste or varnish together with a recommendation of a suitable desensitizing toothpaste or mouthwash may also benefit the patient [5, 32]. The patient should also be reassured that any symptoms from these dental procedures may be transient and will resolve within one week [33-35].

It is also important for the dental professional to identify and remove any aetiological or predisposing factors that may impact on successfully treating DH rather than simply providing a desensitising toothpaste or mouthwash [5, 32, 36]. The dental professional should also provide recommendations during any subsequent visits on how the patient may make lifestyle changes (behavioural changes) to reduce the impact of DH on the QoL such as changing or modifying the diet or modifying the patient's toothbrush technique [36-37]. The importance of continuing professional oral care, together with the relevant information on maintaining good oral health (including recommendations on dietary intake and modification of any overzealous toothbrushing techniques) with an emphasis on giving the patient ownership of their oral care is an essential component of successfully managing the impact of DH and improving the patient's QoL [5, 32, 36-37].

References

1. Gillam DG (2013) Current diagnosis of dentin hypersensitivity in the dental office: an overview. Clin Oral Investig. 17 Suppl 1(Suppl 1): S21-S29.
2. Cunha-Cruz J and Wataha JC (2014) The burden of dentine hypersensitivity. In Dentine Hypersensitivity: Developing a Person-centred Approach to Oral Health Robinson PG (ed), pp 34-44.
3. (2003) Canadian Advisory Board on Dentin Hypersensitivity Consensus-based recommendations for the diagnosis and management of dentin hypersensitivity. J Can Dent Assoc. 69:221–226.
4. Brännström M, Åström A (1972) The hydrodynamics of the dentin; its possible relationship to dentinal pain. International Dental Journal, Jun 22(2):219-227.
5. Gillam DG (2017) A New Perspective on Dentine Hypersensitivity – Guidelines for General Dental Practice. Dent Update. Jan 44(1):33-6, 39-42.
6. Haag DG, Peres KG, Balasubramanian M, Brennan DS (2017) Oral Conditions and Health-Related Quality of Life: A Systematic Review. J Dent Res. Jul 96(8):864-874.
7. Brignardello-Petersen R (2017) Tooth loss, periodontal disease, and dental caries may be associated with decreased oral health-related quality of life, but there is no evidence about the magnitude of this association. J Am Dent Assoc. Oct 148(10):e150.
8. Masood M, Newton T, Bakri NN, Khalid T, Masood Y (2017) The relationship between oral health and oral health related quality of life among elderly people in United Kingdom. J Dent. Jan 56:78-83.
9. McGrath C, Bedi R (2001) Can dentures improve the quality of life of those who have experienced considerable tooth loss? J Dent. May; 29(4):243-6.
10. Needleman I, McGrath C, Floyd P, Biddle A (2004) Impact of oral health on the life quality of periodontal patients. J Clin Periodontol. Jun; 31(6):454-7.
11. Zahed M, Ranjbar MA, Azad A (2020) Oral Health-Related Quality of Life in Chronic Liver Failure Patients Measured by OHIP-14 and GOHAI. Biomed Res Int. Dec 26; 2020:8835824.
12. Bekes K, John MT, Schaller H-G, Hirsch C (2009) Oral health-related quality of life in patients seeking care for dentin hypersensitivity J Oral Rehabil; 36 (1): 45–51.
13. Bekes K, Hirsch C (2013) What is known about the influence of dentine hypersensitivity on oral health-related quality of life. Clinical Oral Investigations. 17 (supplement 1): S45–S51.
14. Sixou JL (2013) How to make a link between Oral Health-Related Quality of Life and dentin hypersensitivity in the dental office? Clin Oral Investig. Mar 17 Suppl 1(Suppl 1):S41-4.
15. Gibson B, Boiko OV, Baker S, PG Robinson PG, A Barlow A, Player T, Locker D (2010) The everyday impact of dentin sensitivity: personal and functional aspects. Social Sciences and Dentistry. 1(1) 11–20.

16. Goh V, Corbet EF, Leung WK (2016) Impact of dentine hypersensitivity on oral health-related quality of life in individuals receiving supportive periodontal care. J Clin Periodontol. 2016 Jul;43(7):595-602.

17. Idon PI, Esan TA, Bamise CT (2017) Oral health-related quality of life in patients presenting with dentine hypersensitivity: A randomized controlled study of treatment effect. Eur J Gen Dent 6: 99-105.

18. Idon PI, Sotunde OA, Ogundare TO (2019) Beyond the Relief of Pain: Dentin Hypersensitivity and Oral Health-Related Quality of Life. Front Dent. 16(5):325-334.

19. Bioko OV, Baker SR, Gibson BJ, Locker D, Sufi F, Barlow APS, Robinson PG (2010) Construction and validation of the quality of life measure for dentine hypersensitivity (DHEQ). J Clin Periodontol 37: 973–980.

20. Machuca C, Baker SR, Sufi F, Mason S, Barlow A, Robinson PG (2014) Derivation of a short form of the dentine hypersensitivity experience questionnaire. J Clin Periodontol 41: 46-51.

21. Douglas-De-Oliveira DW, Lages FS, Paiva SM, Cromley JG, Robinson PG, Cota LOM (2018) Cross-cultural adaptation of the Brazilian version of the dentine hypersensitivity experience questionnaire (DHEQ-15). Braz Oral Res. 32(e37):1–10.

22. He SL, Wang JH, Wang MH (2012) Development of the Chinese version of the dentine hypersensitivity experience questionnaire. Eur J Oral Sci. 120:218–23.

23. He SL, Wang JH (2015) Reliability and validity of the Chinese version of the short form of the dentine hypersensitivity experience questionnaire (DHEQ-15). Qual Life Res. 24:1465–9.

24. Basaran S, Celik C (2018) Turkish adaptation of dentine hypersensitivity experience questionnaire (DHEQ). Community Dent Health. 35:47–51.

25. Baker SR, Gibson BJ, Sufi F, Barlow A, Robinson PG (2014) The Dentine Hypersensitivity Experience Questionnaire: a longitudinal validation study. J Clin Periodontol. Jan 41(1):52-9.

26. Porritt JM, Sufi F, Barlow A, Baker SR (2014) The role of illness beliefs and coping in the adjustment to dentine hypersensitivity. J Clin Periodontol. Jan 41(1):60-9.

27. Porritt JM, Sufi F, Baker SR (2016) Utilising daily diaries to examine oral health experiences associated with dentine hypersensitivity. BMC Oral Health.Sep 15;16(1):97.

28. Mason, S., Burnett, G.R., Patel, N. et al. (2019) Impact of toothpaste on oral health-related quality of life in people with dentine hypersensitivity. BMC Oral Health 19, 226.

29. Douglas-de-Oliveira DW, Vitor GP, Silveira JO, Martins CC, Costa FO, Cota LOM (2018) Effect of dentin hypersensitivity treatment on oral health related quality of life - A systematic review and meta-analysis. J Dent. Apr 71:1-8.

30. Pau AKH, Croucher R, Marcenes W (2000) Perceived inability to cope and care-seeking in patients with toothache: a qualitative study. Brit Dent J. 189:503–506.

31. Gillam DG, Bulman JS, Eijkman MA, Newman HN (2002) Dentists' perceptions of dentine hypersensitivity and knowledge of its treatment. J Oral Rehabil. Mar 29(3):219-25.

32. Gillam D, Chesters R, Attrill D, Brunton P, Slater M, Strand P, Whelton H, Bartlett D (2013) Dentine hypersensitivity – guidelines for the management of a common oral health problem. Dent Update. Sep; 40(7):514-6, 518-20, 523-4.

33. Gillam D & Orchardson R (2006) Advances in the treatment of root dentin sensitivity: mechanisms and treatment principles. Endod Top; 13:13–33.

34. Troil BV, Needleman I, Sanz M (2002) A systematic review of the prevalence of root sensitivity following periodontal therapy. J Clin Periodontol 29 (Suppl 3):173–177.

35. Lin YH & Gillam DG (2012) The Prevalence of Root Sensitivity following Periodontal Therapy: A Systematic Review. Int J Dent.:407023.

36. Gillam DG, Ramseier CA (2015) Chapter 10: Advances in the Management of the patient with Dentine Hypersensitivity: Motivation and prevention. In: Dentine Hypersensitivity: Advances in Diagnosis, Management, and Treatment David G. Gillam (ed). Springer International Publishing Switzerland. Pages 143-156.

37. Gillam DG, Yusuf H (2019) Brief Motivational Interviewing in Dental Practice. Dent J (Basel). May 1;7(2):51.

38. Chabanski MB, Gillam DG, Bulman JS, Newman HN (1996) Prevalence of cervical dentin sensitivity in a population of patients referred to a specialist Periodontology Department. J Clin Periodontol. 23:989–992.

39. Gillam DG, Seo HS, Bulman JS, Newman HN (1999) Perceptions of dentin hypersensitivity in a general practice population. J Oral Rehab. 26:710–714.

40. Gillam DG, Seo HS, Newman HN, Bulman JS (2001) Comparison of dentin hypersensitivity in selected occidental and oriental populations. J Oral Rehabil. 28:20–25.

41. Irwin CR, McCusker P (1997) Prevalence of dentin hypersensitivity in a general dental population. J Irish Dent Assoc. 43:7–9.

42. Clayton DR, McCarthy D, Gillam DG (2002) A study of the prevalence and distribution of dentin sensitivity in a population of 17–58-year-old serving personnel on an RAF base in the Midlands. J Oral Rehab. 29:14–23.

43. Pereira R, Gillam DG, Bapatla S, Satyamurthy P (2018) Awareness of Dentine Hypersensitivity among General Dental Practitioners in Mumbai, India. J Odontol 2:1.

44. Gillam DG, Naser Dashti and Chatzopoulou D (2019) A Survey of the Professional Opinions of Kuwaiti Dentists for the Treatment and Management of Dentine Hypersensitivity: A Questionnaire-based Study. Jacobs J Dentistry Res 5(2): 046.

45. Exarchou C, Betsani I, Sakellari D, Chatzopoulou D, Gillam D (2019) A Survey of Dentists in the Management of Dentine Hypersensitivity: A Questionnaire-based Study. Eur J Dent. Jul;13(3):383-390.

46. Gillam DG, Chana B, Kumar K, Martin E (2020) Knowledge of UK Dental Professionals in Treating Dentine Hypersensitivity. JSM Dent 8(3): 1130.

47. Hatton J, Kumar K, Gillam DG (2020) Knowledge of UK Dental Undergraduates and Dentists in Treating Dentine Hypersensitivity. Dental Oral Biology and Craniofacial Research 3(3); 1-6.