



Dental Anxiety, Communication and the Dental Team: Responses to Fearful Patients

Ruth Freeman, PhD, and Gerry Humphris, PhD, MClInPsychol CPsychol

ABSTRACT Dental anxiety often persists through lack of good communication skills. Dental health professionals (DPHs) can use the treatment alliance to prevent dental anxiety from developing. DPHs should assist dentally anxious patients by encouraging them to express their fears early on. The DHP is advised to acknowledge patients' emotions, spend two to three minutes to learn about specific patient-centered issues and modify the treatment procedures accordingly. We also caution about the ineffectiveness of sedation for treating dental anxiety.

AUTHORS

Ruth Freeman, PhD, is a professor of dental public health research in the Dental Health Services Research Unit at the University of Dundee in Dundee, Scotland, and an honorary consultant of dental public health at NHS Tayside in Dundee, Scotland.
Conflict of Interest
Disclosure: None reported.

Gerry Humphris, PhD, MClInPsychol CPsychol, is a professor of health psychology at the University of St. Andrews School of Medicine in St. Andrews, Scotland, and an honorary consultant clinical psychologist at Western General Hospital in Edinburgh, Scotland.
Conflict of Interest
Disclosure: None reported.

The term dental anxiety was originally coined by Coriat, who stated that dental anxiety was anticipatory, a fear of the unknown with experiences of past treatments repeated rather than remembered.¹ In the intervening 80-year period, dental anxiety has become a major focus of dental research,^{2,3} and clinically, as a psychological construct, it has a clear definition and a variety of management approaches.^{4,5} There is some debate about the difference between dental anxiety and dental phobia.⁶ Although there is overlap with dental phobia,⁷ often considered an extreme of dental anxiety, there are distinct features of phobia (for example, avoidance) that separate phobic individuals from those who experience dental anxiety.⁸

In the following paragraphs, we will describe the association between our understanding of dental anxiety etiology for both adults and children and the

treatment strategies that are routinely used for both in dental practice. The rationale for this approach is drawn from Smith and Freeman's qualitative exploration of adult and child patients, which demonstrated the intergenerational connection between adult and child dental anxiety.⁹

The etiology of adult dental anxiety has been described as a direct consequence of fearful and/or unpleasant dental treatment experiences in childhood and/or adolescence. While this work pointed to the primacy of the frightening incident(s), it was acknowledged that other factors such as, for example, "vicarious learning through significant others and the media, and ... factors such as inheritance and personality traits" also played an important role in dental anxiety etiology. The means of treating dentally anxious adult patients followed this formulation. Therefore, dental health professionals (DHPs) provided behavioral management techniques and/

or pharmacological techniques to help the fearful patient accept dental care. Despite research¹⁰ that acknowledged nondental aspects of dental fear and called for a more holistic appreciation of dental anxiety, there appeared to be an absence of communication strategies to understand the patients' perceptions of their fears and thereby reduce their dental anxiety.¹¹

An equivalence with regard to child dental anxiety etiology and adherence to symptomatic treatment management existed. A review of management of child dental anxiety therefore showed that there was a focus on conscious sedation and dental general anesthesia. This work, however, did not provide strong evidence for reducing child dental anxiety and suggested that the research suffered significant bias.¹² Dentally anxious children who received general anesthesia found it frightening and unpleasant, "being scared/worried and experiencing discomfort from the IV cannula."¹³ Relief that the dental problem had been resolved and attention received from the mother were regarded as the possible positive aspects in a procedure that parents and dental professionals wished to avoid. A five-year follow-up of children treated with dental general anesthesia found some evidence of return to routine dental care but there was no evidence that the child's dental fear had been resolved. This was a disappointing conclusion and indicated that researchers and DHPs had, as they did with adults, concentrated on symptom removal and had misinterpreted the psychological pathways giving rise to child dental anxiety.¹⁴ Support for this proposition is found in a detailed study of fearful children. This work showed that children's dental anxiety was not simply a result of dental treatment experience but a consequence of factors related to the child's fears of separation, harm and helplessness. The child's anxiety connected to the actual experience of dental treatment fed these

internal dangers. Of central importance in this formulation was not the invasiveness of the dental treatment intervention, per se, but how it was interpreted by the child in accordance with their degree of psychological development together with their fears of separation, harm and helplessness. Such formulations as the above are instructive for DHPs if they are to form a treatment alliance and manage the child who presents with dental anxiety.¹⁵ Therefore, attempts to reduce the invasiveness of dental treatments for children with caries may or may not have

Communication interventions to reduce fears of the unknown have been demonstrated to reduce child anxiety and encourage treatment.

the wished-for advantages in reducing anxiety for children with dental fear.¹⁶ However, communication interventions to reduce fears of the unknown have been demonstrated to reduce child anxiety and encourage treatment.¹⁷ A mapping of systematic reviews in children's dentistry, moreover, has produced few straightforward answers to community organization of services and calls have been made for high-quality research studies to improve our knowledge.¹⁸

Thus, alternative, more patient-centered approaches are necessary for both adults and children. For adults, there is a need for "realistic dentistry"¹⁹ as applied in the medical service sector, to promote effective communication between patient and clinician and patient-centered clinical decision-making. Such patient-

centered approaches as the use of internet cognitive behavioral therapy intervention to assist dentally anxious children are a promising and alternative intervention.²⁰ A recent example has already tested the feasibility and acceptability of such an intervention.²¹ Therefore, the need to place communication in the center of management strategies for dentally anxious adults and children is apparent.

Communication

Advantages of adopting patient-centered approaches²² include improved patient satisfaction with treatment, adherence to preventive recommendations, lowered litigation, reduced work-related stress and improved health outcomes. Communication is vital for patient-centered approaches. Communication is the means by which the DHP forges the treatment alliance with the patient and permits the DHP to understand the felt needs and the difficulties dentally anxious patients experience. We propose, therefore, that communication is the fulcrum of the treatment alliance, and it is through communication that DHPs understand patient fears, assist patients to cope and develop a treatment plan appropriate to the patient's psychological and dental treatment needs. Thus, we postulate that many problems dental patients experience when interacting with DHPs "arise from issues of (poor) communication."²³

Evidence From Child Patients' Dentistry

Studies in pediatric settings have shown that communication between the DPH and the child as well as between the parent and child critically influence the child's anxiety level during dental procedures. Within pediatric dentistry are examples where communication between DHPs and the child patient is recognized as essential. In an early systematic review of the influence of dental staff behavior on the

young child to reduce child dental anxiety and disruptive behavior, it was found that engagement by the dentist with the child was important.²⁴ There has been some interest in observing children's reactions to dental treatment, for example, Versloot and colleagues²⁵ showed that pain behavior was more visible in children on receipt of a local anesthetic injection in comparison to the Wand, a device to reduce injection pain experience, and Carson and Freeman showed that effective communication in the preparation of children undergoing dental general anesthesia reduced child anxiety.²⁶ However, in these studies,^{25,26} the focus on the dentists' verbal and nonverbal behavior was absent.

More in-depth work examining the communications within the DPH-child dyad has pointed to some interesting findings. For instance, the use of reassurance by DHPs, usually regarded as useful, was shown to have inconsistent effects within the treatment alliance. A major empirical observational study in the preschool nursery setting to improve child acceptance of fluoride varnish application concluded that the use of reassurance by extended duty dental nurses (EDDNs) to comfort preschool (aged 2 to 5) children ($n = 270$) and their anxious-related behavior was not successful.²⁷ The effect was opposite of that expected — children provided with reassurance were less likely to accept the fluoride varnish application. Careful frame-by-frame analysis of video recording of the fluoride varnish intervention gave rise to a custom-made video-coding scheme (SABICS), which was developed focusing on 25 defined behaviors.²⁸ These behaviors included information giving, reassurance, praise and permission seeking. Hence, the advantage of this coded analysis system is that it recorded event behaviors in real time, taking account of the time point within the interaction, rather than accepting

that effects might occur as a result of previous behavior within the interaction (e.g., Weinstein²⁹ and Prins³⁰ studies). The child was found to exhibit more anxiety-related behavior when reassurance was used by staff, especially when this clinical behavior was used early in the consultation. One interpretation was that reassurance was being used as a reactive device on observation of child anxious-related behavior where specific praise for a small step toward a positive acceptance of dental care may have produced a more positive outcome. Therefore, the use of

In a recent survey ..., it was found that those who were somewhat fearful of attending the dentist "felt more often that there was a deficit in communication with the dentist."

reassurance reduced the nurses' worries rather than the anxiety of the child. It may be suggested that the EDDNs misread the nonverbal communications, due to their own anxieties, and intervened too early. The communication behaviors that were found to discriminate ($p < .01$) in receiving a fluoride application were praise, instruction, information-giving and paying a compliment.

More recently, our research in the East of Scotland concentrated on the dynamics of mother-child interaction with the DHP. This was of importance because it is through the parent that the treatment alliance with the child is made.³¹ The triadic processes of communication are complex to investigate but are necessary because parents are encouraged to accompany their children

into the dental office when receiving treatment. Therefore, to understand further the observations detected in the video recordings during fluoride varnish application appointments with the parent present, a new coding scheme based upon SABICS was prepared and tested.³² This new video-coding scheme, known as the PaeD-TrICS was necessary to include the behaviors and the interactions between parent and child and parent and DHP.³³ PaeD-TrICS has an additional 17 behaviorally defined codes, which include dentally engaging talk, tell-show-do talk and distraction using toys. Early results are indicative of key interactions between the child and DHP where the parent has a key role in the development of the treatment alliance between their child and DHP and thus assists their child to accept dental treatment. The findings from this observational work in dental practice support our suggestion that the parent, if not too anxious, acts as a central figure in the treatment alliance between the child and the DHP. Moreover, this work provides evidence for the "case for the mother in the surgery" to enable children to accept the dental treatment that is offered by the DHP.³¹

Evidence From Adult Patients' Dentistry

In a recent survey of Finnish people ($n = 5,086$) attending the dentist, it was found that those who were somewhat fearful of attending the dentist "felt more often that there was a deficit in communication with the dentist."³⁴ Of interest is the finding in a previous study that when dentists and patients were asked to describe the ideal qualities of a dentist, the only feature agreed upon was "communicativeness."³⁵ A recently published secondary analysis of national U.K. data supported the Finnish work and showed that dental anxiety together with communication affected the interval between dental visiting.³⁶

Our own work has concentrated on two areas: methods to assess dental anxiety and assessments of emotional talk within the dental setting. We have developed two inventories that are easy to score, interpret and use in the dental clinic by DHPs and dental educators. These simple self-report tools are the Modified Dental Anxiety Scale (MDAS) (translated into 24 international languages, see st-andrews.ac.uk/dentalanxiety) and the Modified Child Dental Anxiety Scale-faces³⁷ (MCDASf) for use with children as young as age 5. These inventories have their roots in the popular Corah's Dental Anxiety Scale.³⁸ Both MDAS and MCDASf have simpler answering schemes that are more accessible for patients. In addition, they have more comprehensive item sets to attribute ratings of dental anxiety to specific treatment elements.

It is appreciated that patients may have difficulty in expressing their dental anxiety and that this can be shown in various ways.⁸ Therefore, we have worked on the issue of behavioral coding of emotional expression within dental treatment sessions. We have progressed studies that have identified dentists' responses to explicit (e.g., crying) or nonexplicit (e.g., repeating words) emotions using an internationally recognized coding system named the Verona (VR) CoDES.³⁹ Frequently, the patient provides emotional hints — known as cues in the VR CoDES system — that may be explicit or nonexplicit and tend to be more common than overt emotional expressions. Emotional expressions are defined as concerns in the VR CoDES system.

We have developed a special version of the VR-CoDES for application in the dental setting.⁴⁰ This new version of the VR-CoDES was used to assess the emotional cues and concerns when using the MDAS at the start of the consultation. The MDAS acted as a means by which the patient could present a record of their

TABLE

Six-Step Incorporation of the MDAS in Routine Dental Practice (derived from Hally et al.¹¹)

Step	Content
1	Receptionist gives clear instruction to the patient to complete the MDAS form in the waiting room and personally hand it to the dentist.
2	Dentist thanks the patient for the MDAS form.
3	Dentist looks specifically at the replies completed by the patient on the MDAS form.
4	Dentist comments on the total score (range: minimum of 5 to maximum of 25).
5	Dentist asks the patient about individual scores on the five items that appear high.
6	Dentist checks with the patient to see if they have some* other concerns.

*Do not use the term "any concerns."⁴²

dental anxiety to their DHP and provide an opportunity for the DHP to respond. The hypothesis being proposed is that the DHPs' appropriate response potentially would have a positive and long-lasting effect on patient dental anxiety. This research is summarized in a paper by Hally et al.¹¹ Hally videoed the patient handing the completed MDAS to the dentist. Of interest was the strong effect on patient dental anxiety when the dentist acknowledged the dental anxiety stated on the MDAS written form during the first few minutes of the appointment. This was in stark contrast to those occasions when the MDAS form and the patient's attempts to discuss their fears were ignored by the dentist. Interestingly, the evidence of the strong effect (Cohen's $d = 0.76$) of the dentist's acknowledgement of patient dental anxiety was confirmed in the three-month follow-up MDAS score, which showed an average reduction in dental anxiety of seven units of this scale that has an effective range of 20 units. The adoption of Jacobson and Truax's reliable change index (RCI) confirms that this was a clinically significant change.⁴¹

Clinical Significant Change

We believe that the use of MDAS to reduce dental anxiety and forge the treatment alliance has wide applicability across general and specialist dental practice. The administration of MDAS is easily achievable when all new patients complete the MDAS in the waiting room and give it directly to the dentist,

especially for patients who are dentally anxious (scoring 19 or above on the MDAS). The physical provision of the MDAS questionnaire to the patient at the receptionist desk would seem to be important, as opposed to mailing it out beforehand. This process of the patient completing the questionnaire immediately prior to entering the dental office appears important to gain the psychological effect of the DHP paying special attention to the recently completed form. The **TABLE** lists the recommended steps to introducing this procedure into regular practice that we estimate on average would take about a minute to implement. Note that Step 6 instructs the DHP to invite the patient to state some other concerns that they might have. The word "some" is deliberate and enables a near twofold increase in concern elicitation in comparison to the use of the word "any." This simple choice of words was confirmed in a sophisticated cluster randomized controlled trial designed by a linguistically trained sociologist in general practices in California and the Midwest.⁴² We would encourage replication and extension of this "intervention." Other examples of what can be included in the communication style of DHPs can be given. For brevity sake, we focus simply on the use of reassurance that is often advocated, but its practice is far from straightforward. The DHPs should be very careful when using the phrase "do

not worry.” The typical patient response is immediate and often negative. They may relax momentarily. The dentally anxious patient, however, is likely quick to reassess this statement and may say to themselves, “Well, that means I really need to worry!” Work completed by one of the authors in the oncology field⁴³ is instructive when examining consultations, and the modeling of the different types of reassurance is far from simplistic. The best advice currently would be for the DHP to provide a reassuring statement that is based upon supplying some new information (such as the sensation the patient may feel) rather than exhortations not to worry.

This work has shown that the DHPs’ recognition and response to patient cues and concerns are central to the dentally anxious patient’s longer-term ability to accept the dental treatment offered by the DHP — the treatment alliance. Moreover, effective communication increased satisfaction with care and adherence with dental preventive advice. This is partially supported in an early study that included conducting exit interviews with 68 dentally anxious adults following successful treatment.⁴⁴ They found that patients’ reduction of dental fear was due to their dentist holding conversations with them about their fears and relaxation. In addition, dental personnel being accepting of patients’ anxiety was also an important feature of enabling treatment to be conducted.

Additional Factors

The treatment alliance between the DHP with both the younger and older patient is a key process, as has been argued above, however, the ambiance of the dental office also requires careful consideration. That is when attention is paid to the way a young person is made to feel welcome upon entering the dental office, and this

experience for the patient can be enhanced with easily comprehensible settings for clinical care. Such an approach will assist the dental team in helping the patient relax.⁴⁵ In addition, with the ubiquitous spread of social media, there are likely to be many opportunities to engage, especially with young people who are active consumers, in a manner that might help to reduce barriers and enable engagement to occur with a positive outcome of preventing dental anxiety from developing.⁴⁶ Examples of how social media may be used in this regard include YouTube. It has been suggested that YouTube could provide a platform for patients to reveal their perceptions of their dental anxiety and for information to assist in reducing fears of the unknown through video clips.⁴⁷

Future Recommendations

There are two major domains of communication in the practice that require urgent focus. The first is the interaction between the “actors” within the dental office. Dentists may want to occasionally record their interactions and share this information with their patients, with their permission, as an educational tool and record. The analysis of these records would provide exemplary opportunity to study interaction in great detail and draw out recommendations and guidelines for dentists. This approach has been recognized in general medical practice.⁴⁸ This compilation would assist both the dental team and their patients, taking into account the procedure being conducted and the background of the patient and dentist to develop evidence-based recommendations and guidelines for dentists and to improve the standard of care.

The second urgent domain for attention and resources is enhanced training of the dental team in communication skills. Past surveys

have shown a limited involvement by dental schools to invest properly in active practical training to coach and progress trainees in the improvement and sustainability of good communication practice within the dental office.⁴⁹ With the emphasis on prevention of major oral diseases, this aspect is now timely. In the United Kingdom, a scoping review reported in 2017 the need for integration of learning communication skills within the conventional five-year training programs.⁵⁰ It was noted specifically that students tended not to appreciate the importance of the dentist-patient relationship, especially with difficult consultations and for patients who are dentally anxious. In our opinion, similar review and change is needed in the United States as well. There is a disconnect between what is learned in the classroom about communications and what is modeled in the clinic.

Conclusion

There is now compelling evidence to show that the course of a patient’s dental anxiety experience is based upon the emotional interaction of the dental team with the patient. That is not to say that other factors such as vulnerability within the patient and past traumatic experiences do not play a significant part. Our thesis is that to understand and be able to intervene in the trajectory of dental anxiety within patients, a much more sophisticated approach to analyzing the qualities of the communication between the patient and dental team member needs to be cataloged. The technology of this approach is within reach and requires the support of the profession, researchers and health communication specialists to harvest the fundamental relationships of personal qualities, dental settings and context, patient emotional expression and clinician responses. ■

REFERENCES

1. Coriat IH. Dental anxiety; fear of going to the dentist. *Psychoanal Rev* 1946;33:365–7.
2. Seligman LD, Hovey JD, Chacon K, Ollendick TH. Dental anxiety: An understudied problem in youth. *Clin Psychol Rev* 2017 Jul;55:25–40. doi: 10.1016/j.cpr.2017.04.004. Epub 2017 Apr 19.
3. Beaton I, Freeman R, Humphris G. Why are people afraid of the dentist? Observations and explanations. *Med Princ Pract* 2014;23(4):295–301. doi: 10.1159/000357223. Epub 2013 Dec 20.
4. Goettems ML, Zborowski EJ, Costa FD, Costa VP, Torriani DD. Nonpharmacologic Intervention on the Prevention of Pain and Anxiety During Pediatric Dental Care: A Systematic Review. *Acad Pediatr* 2017 Mar;17(2):110–119. doi: 10.1016/j.acap.2016.08.012.
5. Carter AE, Carter G, Boschen M, AlShwaimi E, George R. Pathways of fear and anxiety in dentistry: A review. *World J Clin Cases* 2014 Nov 16; 2(11):642–53. doi: 10.12998/wjcc.v2i11.642.
6. Asl AN, Shokravi M, Jamali Z, Shirazi S. Barriers and Drawbacks of the Assessment of Dental Fear, Dental Anxiety and Dental Phobia in Children: A Critical Literature Review. *J Clin Pediatr Dent* 2017;41(6):399–423. doi: 10.17796/1053-4628-41.6.1. Epub 2017 Sep 22.
7. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders (DSM-5). Washington, D.C.: American Psychiatric Association Publishing, 2013.
8. Freeman R. A psychodynamic theory for dental phobia. *Br Dent J* 1998;184(4):170–2.
9. Smith PA, Freeman R. Remembering and repeating childhood dental treatment experiences: Parents, their children and barriers to dental care. *Int J Paediatr Dent* 2010 Jan;20(1):50–8. doi: 10.1111/j.1365-263X.2009.01004.x. Epub 2009 Oct 12.
10. Locker D, Poulton R, Thomson WM. Psychological disorders and dental anxiety in a young adult population. *Community Dent Oral Epidemiol* 2001 Dec;29(6):456–63.
11. Hally J, Freeman R, Yuan S, Humphris G. The importance of acknowledgement of emotions in routine patient psychological assessment: The example of the dental setting. *Patient Educ Couns* 2017 Nov;100(11):2102–2105. doi: 10.1016/j.pec.2017.05.005. Epub 2017 May 5.
12. Lourenço-Matharu L, Ashley PF, Furness S. Sedation of children undergoing dental treatment. *Cochrane Database Syst Rev* 2012 Mar 14;(3):CD003877. doi: 10.1002/14651858.CD003877.pub4.
13. Rodd H, Hall M, Deery C, et al. 'I felt weird and wobbly.' Child-reported impacts associated with a dental general anaesthetic. *Br Dent J* 2014 Apr;216(8):E17. doi: 10.1038/sj.bdj.2014.333.
14. Savanheimo N, Vehkalahti MM. Five-year follow-up of children receiving comprehensive dental care under general anesthesia. *BMC Oral Health* 2014 Dec 15;14:154. doi: 10.1186/1472-6831-14-154.
15. Freeman R. A fearful child attends: A psychoanalytic explanation of children's responses to dental treatment. *Int J Paediatr Dent* 2007;17(6):407–18.
16. Arrow P, Klobas E. Minimum intervention dentistry approach to managing early childhood caries: A randomized control trial. *Community Dent Oral Epidemiol* 2015 Dec;43(6):511–20. doi: 10.1111/cdoe.12176. Epub 2015 Jun 17.
17. Wilson S. Management of child patient behavior: Quality of care, fear and anxiety and the child patient. *Pediatr Dent* 2013 Mar-Apr;35(2):170–4.
18. Mejare IA, Klingberg G, Mowafi FK, et al. A systematic map of systematic reviews in pediatric dentistry – what do we really know? *PLoS One* 2015 Feb 23;10(2):e0117537. doi: 10.1371/journal.pone.0117537. eCollection 2015.
19. Realistic medicine to improve the quality of care in Scotland. *Bull World Health Organ* 2017 Jun 1;95(6):395–396. doi: 10.2471/BLT.17.030617.
20. Rooksby M, Elouafkaoui P, Humphris G, Clarkson J, Freeman R. Internet-assisted delivery of cognitive behavioural therapy (CBT) for childhood anxiety: Systematic review and meta-analysis. *J Anxiety Disord* 2015 Jan;29:83–92. doi: 10.1016/j.janxdis.2014.11.006. Epub 2014 Dec 4.
21. Shahnavaz S, Hedman-Lagerlöf E, Hasselblad T, et al. Internet-Based Cognitive Behavioral Therapy for Children and Adolescents With Dental Anxiety: Open Trial. *J Med Internet Res* 2018 Jan 22;20(1):e12. doi: 10.2196/jmir.7803.
22. Finset A. Research on person-centred clinical care. *J Eval Clin Pract* 2011 Apr;17(2):384–6. doi: 10.1111/j.1365-2753.2010.01608.x. Epub 2011 Jan 5.
23. Watzlawick P, Beavin-Bavelas J, Jackson D. *Pragmatics of human communication: A study of interactional patterns, pathologies and paradoxes*. 1st ed. New York: Norton; 1967.
24. Zhou Y, Cameron E, Forbes G, Humphris G. Systematic review of the effect of dental staff behaviour on child dental patient anxiety and behaviour. *Patient Educ Couns* 2011 Oct;85(1):4–13. doi: 10.1016/j.pec.2010.08.002. Epub 2010 Aug 31.
25. Versloot J, Veerkamp JS, Hoogstraten J. Pain behaviour and distress in children during two sequential dental visits: Comparing a computerised anaesthesia delivery system and a traditional syringe. *Br Dent J* 2008 Jul 12;205(1):E2; discussion 30–1. doi: 10.1038/sj.bdj.2008.414. Epub 2008 May 23.
26. Carson P, Freeman R. Tell-show-do: Reducing anticipatory anxiety in emergency paediatric dental patients. *Int J Health Promot Educ* 1998;36:87–90.
27. Zhou Y, Humphris GM. Reassurance and distress behavior in preschool children undergoing dental preventive care procedures in a community setting: A multilevel observational study. *Ann Behav Med* 2014 Aug;48(1):100–11. doi: 10.1007/s12160-013-9566-7.
28. Zhou Y, Cameron E, Forbes G, Humphris G. Development of a novel coding scheme (SABICS) to record nurse-child interactive behaviours in a community dental preventive intervention. *Patient Educ Couns* 2012 Aug;88(2):268–76. doi: 10.1016/j.pec.2012.01.001. Epub 2012 Feb 1.
29. Wurster CA, Weinstein P, Cohen AJ. Communication patterns in pedodontics. *Percept Mot Skills* 1979 Feb;48(1):159–66.
30. ter Horst G, Prins P, Veerkamp J, Verhey H. Interactions between dentists and anxious child patients: A behavioral analysis. *Community Dent Oral Epidemiol* 1987 Oct;15(5):249–52.
31. Freeman R. The case for mother in the surgery. *Br Dent J* 1999 Jun 26;186(12):610–3.
32. Yuan S, Humphris G, Macpherson LM, Ross A, Freeman R. Development of an Interaction Coding Scheme (Paed-TriCS) to record the triadic communication behaviours in paediatric primary care dental consultations. 2019. Unpublished manuscript.
33. Yuan S, Humphris G, Ross A, et al. A mixed-methods feasibility study protocol to assess the communication behaviours within the dental health professional-parent-child triad in a general dental practice setting. *Pilot Feasibility Stud* 2018 Aug 13;4:136. doi: 10.1186/s40814-018-0331-3.
34. Raittio E, Lahti S, Suominen AL. Adult Finns' perceptions about communication with the dentist during their latest visit. *Community Dent Oral Epidemiol* 2019 Apr;47(2):112–118. doi: 10.1111/cdoe.12431. Epub 2018 Oct 29.
35. Lahti S, Tuutti H, Hausen H, Kääriäinen R. Opinions of different subgroups of dentists and patients about the ideal dentist and the ideal patient. *Community Dent Oral Epidemiol* 1995 Apr;23(2):89–94.
36. Shahid M, Freeman R. What is the function of psychosocial factors in predicting length of time since last dental visit? A secondary data analysis. *Int Dent J* 2019 Apr 13. doi: 10.1111/idj.12483. [Epub ahead of print].
37. Howard KE, Freeman R. Reliability and validity of a faces version of the Modified Child Dental Anxiety Scale. *Int J Paediatr Dent* 2007 Jul;17(4):281–8.
38. Corah NL. Development of a dental anxiety scale. *J Dent Res* 1969 Jul-Aug;48(4):596.
39. Piccolo LD, Finset A, Mellblom AV, et al. Verona Coding Definitions of Emotional Sequences (VR-CoDES): Conceptual framework and future directions. *Patient Educ Couns* 2017 Dec;100(12):2303–2311. doi: 10.1016/j.pec.2017.06.026. Epub 2017 Jun 21.
40. Wright A, Humphris G, Wanyonyi KL, Freeman R. Using the Verona coding definitions of emotional sequences (VR-CoDES) and health provider responses (VR-CoDES-P) in the dental context. *Patient Educ Couns* 2012 Oct;89(11):205–8. doi: 10.1016/j.pec.2012.05.006. Epub 2012 Jun 12.
41. Jacobson N, Truax P. Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *J Consult Clin Psychol* 1991 Feb;59(1):12–9.
42. Heritage J, Robinson JD, Elliott MN, Beckett M, Wilkes M. Reducing Patients' unmet concerns in primary care: The difference one word can make. *J Gen Intern Med* 2007 Oct;22(10):1429–33. Epub 2007 Aug 3.
43. Popov V, Ellis-Robinson A, Humphris G. Modelling reassurances of clinicians with hidden Markov models. *BMC Med Res Methodol* 2019 Jan 9;19(1):11. doi: 10.1186/s12874-018-0629-0.
44. Moore R. Dental fear treatment: Comparison of a video training procedure and clinical rehearsals. *Scand J Dent Res* 1991 Jun;99(3):229–35.
45. Norton-Westwood D, Pearson A, Robertson-Malt S. The ability of environmental healthcare design strategies to impact event related anxiety in paediatric patients: A comprehensive systematic review. *JBI Libr Syst Rev* 2011;9(44):1828–82.
46. Parmar N, Dong L, Eisingerich AB. Connecting With Your Dentist on Facebook: Patients' and Dentists' Attitudes Towards Social Media Usage in Dentistry. *J Med Internet Res* 2018 Jun 29;20(6):e10109. doi: 10.2196/10109.
47. Gao X, Hamzah SH, Yiu CK, McGrath C, King NM. Dental fear and anxiety in children and adolescents: Qualitative study using YouTube. *J Med Internet Res* 2013 Feb 22;15(2):e29. doi: 10.2196/jmir.2290.
48. Ryan P, Luz S, Albert P, et al. Using artificial intelligence to assess clinicians' communication skills. *BMJ* 2019;364:l161. doi: 10.1136/bmj.l161.
49. Yoshida T, Milgrom P, Coldwell S. How do U.S. and Canadian dental schools teach interpersonal communication skills? *J Dent Educ* 2002;66(11):1281–8.
50. Ayn C, Robinson L, Nason A, Lovas J. Determining Recommendations for Improvement of Communication Skills Training in Dental Education: A Scoping Review. *J Dent Educ* 2017 Apr;81(4):479–488. doi: 10.21815/JDE.016.003.

THE CORRESPONDING AUTHOR, Gerry Humphris, PhD, MCLinPsychol CPsychol, can be reached at gmh4@st-andrews.ac.uk.