University of BRISTOL

Project Proposal

Title:
Behavioural motivation to enhance adherence to oral hygiene recommendations for patients in General Dental Practice

Background and Rationale:
This is a study undertaken by the University of Bristol supported by a grant from Procter and Gamble.

A primary role of the General Dental Practitioner is the delivery of evidence-based interventions to enhance oral health related behaviour, in order to improve patients' knowledge, attitudes and skills, in the prevention of oral disease (Department of Health, 2009).

It has been found that there is a large variation in advice offered by general dental practitioners and oral hygiene product companies (Wainright and Sheiham, 2014), and that often, recommendations are not followed well by patients (Watt, 2000). This could be due to the difficulties encountered when trying to follow the advice or successful use of the techniques recommended, the inability of the patient to retain the information, or that it is contradictory to other information the patient has received (Wainright and Sheiham, 2014).

A study carried out in 2010 found that dental foundation trainees (DFTs) embarking on their first year in general practice felt that the training they received at undergraduate level on the delivery of oral health advice (OHA) was not adequate for general practice. The main concerns of the DFTs were time limitations, lack of interest of patients, and the opinion that dentists are not rewarded for the time needed to deliver OHA. It was suggested a more realistic approach needed to be developed in order to deliver OHA in the general dental practice setting (Humphreys et al, 2010).

Prevention lies at the core of the new NHS dental contract. Improving oral health is fundamental to the prevention of oral diseases, the success of which lies in the education of patients. It is important to determine the efficacy of methods of communication that GDPs utilise, and also develop more effective tools which may improve the delivery of OHA to bring about changes in patient behaviours. Threlfall et al (2007) stated that unless GDP education methods and counselling skills improve, an opportunity for change will be missed.

Recently a number of interventions have been designed that have been shown to modify behaviour and improve adherence to oral hygiene regimens (Suresh et al 2011), with the use of goal setting, self-monitoring and planning shown to be effective in patients with periodontal disease (Newton and Asimakopoulou 2015). These techniques actively involve the patient in recognising what they need to do to improve their oral hygiene by the use of open questions,

reflection and guidance together with follow up support between dental appointments. Techniques can be adapted to meet the needs of the patients such that those with the poorest oral health receive the most motivation.

This project will assess whether behavioural motivation to enhance adherence to oral hygiene is more effective in improving oral hygiene in patients at high or low risk of oral disease compared to standard oral health instruction where patients are provided with simple instruction alone.

A further aim of this study is to assess if the young foundation dentists and hygienists have found the motivational oral hygiene advice training of benefit to them thus providing them with additional tools to help their patients succeed in maintaining oral health.

Research Question:
Can behavioural motivation improve oral hygiene for patients in General Dental Practice?

Aims:
The primary aim of the study is to assess whether the oral health of patients attending general dental practice is improved using advanced behavioural intervention techniques as compared to standard oral health instruction alone. The study will be performed by dental foundation trainees (DFT) and hygienists in general dental practice

Primary Objective

- To determine whether patients receiving advanced behavioural intervention techniques over a 3 month period have reduced bleeding on probing compared to patients receiving standard oral health instruction

Secondary Objectives:

- To determine whether patients receiving advanced behavioural intervention techniques over a 3 month period have reduced plaque scores compared to patients receiving standard oral health instruction.
- To determine whether there are changes to patient self-reported attitudes relating to improving oral hygiene after 3 months.
- To determine whether there are changes in patient self-reported oral hygiene regimens after 3 months.
- To determine if there are changes in DFTs and hygienists Oral Health knowledge and behaviour pre and post training and following the study

Study Design:
This study will be a cluster randomised 8-treatment, parallel study performed in NHS dental practices across the UK, undertaking Foundation Training for newly qualified dentists.

The study will assess and compare the outcome of different Oral Health instruction regimens which are stratified for high and low risk of oral disease in NHS dental patients. There will be a

further sub-set of patients across the regimens that are further assigned to receive a power toothbrush. The study flow will be as outlined below:

- Patients will be recruited from dental practices participating in the DFT schemes.
- Patients will be informed about the study. If they are interested to be involved in the study, full written informed consent will be obtained.
- Enrolled patients will be screened against the study inclusion/exclusion criteria and an oral soft tissue examination performed.
- All patients will be asked a short set of questions to gain baseline information about their self reported current oral hygiene practices in the form of a questionnaire (Appendix 2). This will be repeated after 3 months.
- Bleeding on probing assessment of the gingivae will be recorded (yes or no after 30 seconds) and categorised as low or high risk based on the score.
- Plaque levels on the teeth will be recorded following tooth disclosing suitable to detect plaque using the (O'Leary) plaque index (focusing on the gingival margin).
- Patients stratified to either high or low risk of oral disease will be randomised onto either the 'Test' group or the 'Control' group dependent on the practice they visit (Baseline Visit).
- A sub-set of participants across high/low risk and test/control groups will receive a power toothbrush for use during the study.
- The level of Oral health instruction will be provided to patients as per randomisation schedule.
- Unless patients are assigned to receive a power toothbrush, they will continue to use their current method of tooth brushing using either a manual or power toothbrush.
- All patients assigned to the Test group will be provided with an Information sheet on Oral health (Appendix 1) and access to instructional oral hygiene videos (Appendix 3).
- Patients assigned to the high risk/Test group will be provided with a Gum Health Improvement Patient Agreement. The patients will be asked to sign a form agreeing to follow oral health practices as outlined by the DFT/hygienist.
- Patients assigned to the high risk/Test group will also be asked to complete a patient attitudes to oral health questionnaire (Appendix 5) at visit 1 and again after 3 months.
- Following 3 months, patients will return to the dental practice for an oral soft tissue examination, disclosed plaque and bleeding on probing recorded (Final Visit) and complete questionnaires as required.
- DFT/hygienists working in dental practices assigned to be test group sites will be trained in the behavioural interventions prior to the start of the study.
- To ensure the level of oral health advice provided in control sites by the DFTs/hygienists relates to that learnt at dental school, no training in the behavioural interventions will be provided until the end of the study. This is to prevent any influence on the type of oral health instruction provided to patients by the DFTs/hygienists in the dental practices allocated as control sites. Training in the behavioural interventions will be provided at the end of the study after all patients have been seen.
- Assessment of DFT knowledge and feedback before and after training, and 3 months after training assessed by questionnaire. For control sites, assessment will be only pre and immediately post training (Appendix 6).

Recruitment

Sequential adult patients due to attend their dental care professional for a scheduled check up or review appointment will be contacted with an appointment reminder and an introductory short text about the study, a participant information sheet will then be provided. This approach should result in as representative a study sample as is possible.

1. Informed consent
   For every person approached to be included in the study, the DFT dentist/hygienist, or a designee will:

   - Provide the potential participant with an information sheet about the study
   - Explain the study to the potential participant
   - Answer any questions the potential participant has about the study
   - Complete a consent form with participants who agree to take part in the study

   The DFT dentist/therapist will then assess inclusion and exclusion criteria.

2. Inclusion criteria for participants
   a. Healthy volunteers of either gender who are attending a general dental practice for a check up or review appointment with a dental professional.
   b. Aged 18 or over
   c. Understand and are willing, able and likely to comply with all study procedures and restrictions
   d. Accept the form of the study and sign a declaration of informed consent
   e. Have a minimum of 16 teeth not including implants or teeth with crowns or bridges excluding teeth with extra-coronal restorations .

3. Exclusion criteria
   a. Persons incapable of responding to the questions
   b. An employee of the general dental practice, and/or a family relative of the employee
   c. Patients without a smart phone will not be eligible to receive a powered brush

Additional Exclusion Criteria

Patients who do not have a smart phone or have a smart phone but are unfamiliar with using apps will not be included in the subset receiving a powered toothbrush**.**

Expenses and Payment

- All patients (participants) will pay as appropriate for the study baseline visit, as this will be part of a normal scheduled attendance at the recruiting dental practice.
- Patients will not be charged for attending the second visit at three months as this will be part of the research project.
- If at the Baseline visit the participant has pristine gum health (no bleeding of the gums at any site within the mouth), then the Bristol Clinical Trials unit will reimburse travel expenses

on production of receipts for the second study visit. Payments will be arranged through the Central Clinical Trials Office following submission of receipts.

- If at the Baseline visit the participant exhibited bleeding of the gums at any site, then the Bristol Clinical Trials unit will not reimburse travel expenses for the second visit. For patients with any signs of gum bleeding, this second study visit will be of benefit to their oral health as early intervention stops progression to irreversible bone loss around the teeth. This second study visit is designed as a preventative management and above the level of standard care at present on the NHS.
- The second visit at 3 months is currently not standard at present for NHS patients but, it is part of a drive to treat bleeding gums at an earlier stage to prevent bone loss which is irreversible and improve systemic health. Gum disease is known to be associated with diabetes, atherosclerosis, rheumatoid arthritis and premature babies.

Treatment Groups:

There will be a total of 8 treatment groups. These will be comprised of a 'Test' group and a 'Control' group, each stratified to low and high risk relating to oral disease. There will be a further subset of these groups that will receive a power tooth brush. The treatments will be allocated through a cluster randomised design in a 2:1 ratio (in favour of the test group).

Since randomization will occur at the site (cluster) level, patients treated by different DFT/hygienist within each site will all be allocated to either experimental or control intervention at the site (cluster) level.

All patients will be stratified as to either high or low risk relating to oral disease. The level of risk will be determined by bleeding on probing scores as part of the clinical examination. Smoking (cigarettes, roll ups, vaping etc) status will be recorded in the patient self reported oral health questionnaire (smokers do not have as much bleeding on probing due to vasoconstriction of blood vessels).

The 8 possible treatment groups for the study are outlined below

Test Group Enhanced motivational oral hygiene instruction				Control Group Standard oral health instruction as learnt in Dental School			
High Risk		Low Risk		High Risk		Low Risk	
Power toothbrush	Exisitng toothbrush (Manual or power)	Power toothbrush	Exisitng toothbrush (Manual or power)	Power toothbrush	Exisitng toothbrush (Manual or power)	Power toothbrush	Exisitng toothbrush (Manual or power)

The interventions for the test and control groups and subsets are detailed below:

- **Test Group:**

  a. Low risk : Patients will receive:
  - Patient self reported Oral Health Questionnaire (Appendix 2a and b) Visit 1 and 2
  - Oral Health Information Sheet,(Appendix 1) Visit 1 only Visit 1 only
  - Access to oral health instructional videos relating to patients current oral hygiene regimen (Appendix 3)

  OR
  - Patient self reported Oral Health Questionnaire (Appendix 2a and b) Visit 1 and 2
  - Oral Health Information Sheet, (Appendix 1) Visit 1 only
  - Provision of a power toothbrush with review of manufacturers instructions for use including smartphone App and access to power brushing instructional video (Appendix 3) Visit 1 only

  b. High Risk : Patients will receive:
  - Patient self reported Oral Health Questionnaire (Appendix 2a and b) Visit 1 and 2
  - Oral Health Information Sheet,(Appendix 1) Visit 1 only,
  - Gum Health Improvement Patient Agreement (Appendix 4) Visit 1 only
  - Access to oral health instructional videos dependent on patients current oral hygiene regimen (Appendix 3)
  - Patient attitude questionnaire (Appendix 5a and b) Visit 1 and 2

  OR
  - Patient self reported Oral Health Questionnaire (Appendix 2a and b) Visit 1 and 2
  - Oral Health Information Sheet,(Appendix 1) Visit 1 only
  - Gum Health Improvement Patient Agreement (Appendix 4) Visit 1 only
  - Patient attitude questionnaire (Appendix 5a and b) Visit 1 and 2
  - Provision of a power toothbrush with review of manufacturers instructions for use including smartphone App and access to power brushing instructional video (Appendix 3)

- **Control group**

  a. Low risk : Patients will receive
  - Patient self reported Oral Health Questionnaire (Appendix 2a and b) Visit 1 and 2
  - Individualised oral hygiene advice related to risk of oral disease as learnt in dental school and currently practiced. Visit 1 only

  OR
  - Patient self reported Oral Health Questionnaire (Appendix 2a and b) Visit 1 and 2
  - Individualised oral hygiene advice related to risk of oral disease as learnt in dental school and currently practiced. Visit 1 only
  - The provision of a powered toothbrush and manufacturers instructions

  b. High Risk : Patients will receive
  - Patient self reported Oral Health Questionnaire (Appendix 2a and b) Visit 1 and 2
  - Individualised oral hygiene advice related to risk of oral disease as learnt in dental school and currently practiced. Visit 1 only

  OR
  - Patient self reported Oral Health Questionnaire (Appendix 2a and b) Visit 1 and 2
  - Individualised oral hygiene advice related to risk of oral disease as learnt in practice and currently practiced. Visit 1 only
  - The provision of a powered toothbrush and manufacturers instructions.

The smoking status of each patient will be recorded on the Patient self reported Oral Health Questionnaire. At the end of the study, smoking (S) vs Non- Smoking (NS) information will be recorded and analysed in the results (not stratified for)

Power brush

Prior to allocation to receive a power toothbrush, study staff will ask if the patient has access to a smartphone and that they are confident in the use of Apps on the smartphone. Where patients are randomised to receive a power brush, they will be provided with a new power brush which is commercially available. The power toothbrush has a 'feed-back' app so patients can be provided with extra help and motivation with their brushing. Full instruction in the use of the tooth brush and App will be provided according to the manufacturers instructions. In the test group only, these instructions will be reviewed with the patient by study staff. Consent will be requested from the patients assigned to the powerbrush in the test group for the study team to access the feedback data collected by the tooth brush App on tooth brushing records. Patients will be asked to send the app data 1x week to the study site (20 brushing episodes can be downloaded in one go) via email.

Patient Attitudes to Oral Health (Appendix 5)

Patient attitudes towards oral health will be determined using a short questionnaire (7 questions) where the patients will rate on a scale of 1 to 10 statements about oral health.

Gum Health Improvement Patient Agreement (Appendix 4)

Patients assigned to the Test group will be provided with a patient agreement relating to oral health and how to achieve better oral health. The DFT will go through the agreement with the patient and provide information and instruction on oral health as required. The patient and DFT will sign the agreement to work to improve the patients oral health. If a patient does not wish to sign this form, they may withdraw from the study. This will not affect their routine treatment at the dental practice.

BOP and Plaque scoring

Bleeding on probing (BOP)

Full mouth bleeding on probing scores.

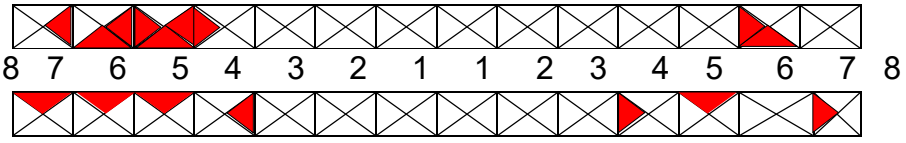
Scores used for allocation to risk groups:

Low risk : BOP < 20% of total sites

High risk: BOP >20% of total sites

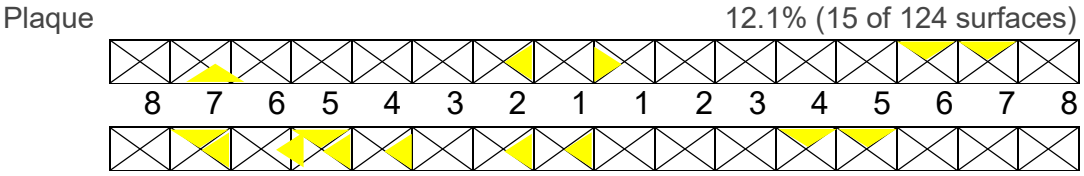
Example of chart for recording scores

Bleeding 14.8% (16 of 108 surface)



Plaque scoring.

Plaque scores will be recorded on a chart (see example below) following the method established by O'Leary et al (1972) disclosing the full mouth



Statistical Methods
Sample Size

The sample size is based on the primary outcome of a change from baseline to 3 months in bleeding on probing. Asimakapoulou et al. report (Table 1) mean bleeding of 8.62% (SD=6.16) at baseline in the treatment as usual group. At about 3 months, this was a mean of 4.11 (SD=5.51). This corresponds to a change from baseline (reduction) of about 4.5% (absolute change), on average. We will assume similar average reductions for the Control group in this study. For the experimental group, we anticipate improvements in the change from baseline (reduction) at least 5% higher (i.e. a mean change from baseline in the control group of 4.5% versus a reduction in bleeding of 9.5% on average and hence a difference of 5% on average). We assume similar estimates of SD of about 6.2. Assuming a conservative estimate of the intra correlation coefficient of 0.5 (low within cluster variability), a coefficient of variation of cluster sizes set at 0.65, a two sided type I error of 5% and power of at least 80%, a sample size of 2400 subjects will be sufficient to detect at least 5% reduction in bleeding on probing over and above the control at 3 months (corresponding to a 52% with control vs 57% with the experimental based on relative changes). In a 2:1 randomization, patients will be randomized such that:

1. There are 780 in the Control Group vs 1620 in the Experimental Group
2. The number of clusters (sites) for the experimental group are 27 and for the control group are 13 (40 sites in a 2:1 ratio)
3. The cluster (site) size (number of subjects) in the experimental group is approximately n=60 per site and the number of subjects per site in the control group are n=60
4. A total of at least 40 practices (sites) are needed

Subgroup analyses:

The maximal subgroup sample size is 500 due to the availability of only 500 toothbrushes. In a 2:1 randomization these will be approximately allocated as 334 in the intervention group and 166 in the control group, regardless of smoking status. These will be further allocated equally within each risk group in a roughly 1:1 ratio as 166 per group (n=334) and 83 per group in the low risk group (n=166).

Although we anticipate treatment effects in the subgroup to be greater than those in the overall group (due to the power brush), for the same 5% difference and a SD of 5.51 with an ICC of 0.50, a sample size of 500 in total would have at least 85% power to detect this difference (of 5%) in the subgroup (i.e. between n=334 vs n=166).

Under the above computed sample size assumptions, we expect that 12 and 13 subjects per site are recruited in the intervention group in order to have a response at month 3 ; and a similar number per site (13 sites) in the control group (about 160 to 180 subjects).

Comparison of High Risk and Low Risk with Toothbrush
With a sample size of n=167 (high risk) in the experimental group and n=83 (high risk) for the control group, there is about 80% power to detect differences of at least 5.5% between the experimental and control groups for the specific subgroups.

If the number of sites overall were to fall to around 30 (20 sites vs 10 sites in a 2:1 randomization), but the number of subjects per group remained at 1620 vs 780 ,the power would be maintained at around 80% to detect an overall difference of at least 5.5% including overall, subgroup and the comparisons between treatments within the risk group with toothbrush.

Population for Analyses.

All analyses will be based on an ITT (Intent to Treat) analysis, defined as all patients randomized (within site) to trial intervention.

Statistical Analyses
Primary Outcome

The primary outcome is the change from baseline to 3 months in bleeding probing expressed as a percent.

This will be analysed using a mixed effects model suited to a cluster randomized design with random effects for sites and effects for subjects within sites (i.e. clusters). The 95% CI along with the mean difference in mean bleeding probing will be reported along with unadjusted p-values. The analyses will be repeated for each strata and will also include covariates for stratification and demographic (and baseline) factors. For the subgroup of subjects given a power brush, a separate analyses will be undertaken to compare effects within this group with the appropriate covariates.

The primary outcome will also be summarized (using summary statistics) by intervention group, cluster, strata and where appropriate assessment points. In addition, for the subgroup, summary statistics will be reported separately.

Secondary Outcomes

- Changes to plaque score from baseline to 3 months measured as a percentage
- Changes in patient self-reported psychological measures related to improving oral hygiene after 3 months
- Changes in patient self-reported tooth brushing, inter proximal cleaning and use of mouthwash from baseline and at 3 months in terms of duration and frequency
- Changes to DFT's knowledge and behaviour pre and post training and at 3 months

Secondary outcomes will be analysed using models suited to a cluster randomized trials allowing for within and between cluster (subjects within cluster) effects. The intra class correlation coefficient will be reported along with estimates of treatment effects and 95% CIs. All other outcomes will be summarized descriptively along with demographic and where appropriate clinical characteristics (by group and site within group).Treatment effects will be adjusted for covariates and stratification variables. Separate effects will be presented for pre-specified subgroups.

Randomisation

Randomization will be at the site (dental practice) level. Patients at each site will be stratified as:

a) High Risk
b) Low Risk

Since the target number of patients **per site** in the experimental group is 40, we expect about 10 subjects to be randomized within each of the strata. If more than 15 subjects are allocated to any one strata, the recruitment to that strata may be suspended until at least 5 subjects are present in each strata (for a given site). A similar approach is adopted for the Control group. For the subgroup, a minimal of 8 to 9 subjects per site should ideally be randomized across the sites.

In order to include the 500 tooth brushes, the randomization will ensure 334 and 166 subjects in the experimental and Control groups across sites are randomly allocated to toothbrush (i.e. there will be some subjects selected at random allocated to a tooth brush). To ensure a 2:1 randomization, the randomization scheme will be as: 'Experimental and High Risk and Toothbrush' or 'Experimental and Low Risk and Toothbrush' or 'Control and High Risk and Toothbrush' or 'Control and Low Risk and Toothbrush'

Dental Foundation Trainees/hygienists:
Up to 60 DFTs/hygienists across the South West and Leeds areas will take part in the study.
Each dentist/hygienist will aim to enrol approximately 50 participants in general dental practice.

Ethical Considerations:

- Avoidance of coercion to take part - there will be no coercion to take part
- Right to withdraw at any time without giving a reaon

- Valid consent – information will be given to patients prior to taking part to ensure they are fully informed about the requirements of their participation
- Data protection – legal requirements will be adhered to.
- The University of Bristol are sponsoring and providing indemnity for the study.

Impact and dissemination:

We hope that this project will improve the awareness of the importance of providing evidence based information and OHA to patients in order to bring about positive behavioural changes. It may highlight the need for formal national UK guidelines on the most effective method of delivering OHA to ensure general dental practitioners are delivering consistent messages to patients.

General dental practitioners may find it difficult to adopt the motivational techniques used in this study without seeking education on these techniques but this barrier may be overcome by ensuring the results of this study and the method of delivering the motivational coaching is made accessible by publishing the results in a well known dental journal.

Educational Supervisors have requested that they can use this tool for their patients in the future raising the impact of the project.

References

Asimakopoulou K, Newton JT. (2014) The contributions of behavior change science towards dental public health practice:a new paradigm. Community Dent Oral Epidemiol 43:2-8.

Asimakopoulou K, Nolan M, McCarthy C, Newton JT. Risk communication improves periodontal outcomes; a randomized controlled trial. ISRCTN59696243. In press.

Davies, R M, et al. Prevention. Part 4: Toothbrushing: What advice should be given to patients?. *BDJ*. 2003. 195:135-141

Department of Health. 2009. *NHS dental services in England: an independent review led by Professor Jimmy Steele*. London: DH Publications.

Department of Health. 2017. *Delivering better oral health: an evidence-based toolkit for prevention*. Third Edition. London: DH Publications.

Humphreys, R.E. et al. 2010. Perceptions of first year foundation dentists on oral health education and its role in general dental practice. *BDJ*. 209:601 – 606

Newton JT, Asimakopoulou K. (2017) Minimally invasive dentistry: Enhancing oral health related behaviour through behaviour change techniques. BDJ 223:147-150.

Newton JT, Asimakopoulou K. (2015) Managing oral hygiene as a risk factor for periodontal disease: a systematic review of psychological approaches to behaviour change for improved plaque control in periodontal management. J Clin Periodontol 42(Suppl16): S36-46

O'Leary TJ, Drake RB, Naylor JE. 1972 The Plaque control record. J Periodontol. 43:38-38

Renz A, Ide M, Newton T, Robinson PG, Smith D. Psychological interventions to improve adherence to oral hygiene
instructions in adults with periodontal diseases. Cochrane Database Syst Rev. 2007 Apr 18;(2):CD005097

Suresh R, Jones KC, Newton JT, Asimakopoulou K. (2011) An exploratory study into whether self-monitoring improves adherence to daily flossing among dental patients J Public Health Dent. 72:1-7.

Schuz B, Sniehotta FF, Wioedemann A, Seeman R. Adherence to a daily flossing regimen in university students:effects of
planning when, where, how and what to do in the face of barriers. J Clin Periodontol 2006;33:612-619

Threlfall, A.G., et al. 2007. Exploring the content of the advice provided by general dental practitioners to help prevent caries in young children. *Br Dent J*. 202:E9.

Watt, R.G., and Marinho, V.C. 2005. Does oral health promotion improve oral hygiene and gingival health? Periodontol. 37:5–47

Wainright, J. and Sheiham, A. An analysis of methods of toothbrushing recommended by dental associations, toothpaste and toothbrush companies and in dental texts. 2014. *BDJ*. 217: E5.

Keeping your mouth healthy

Why is it important to brush my teeth?...

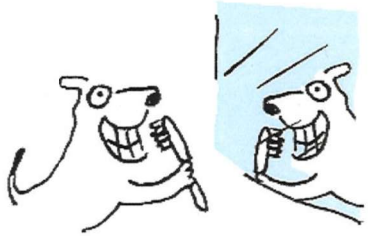
....To remove plaque!

Plaque is the name of the sticky deposit which forms on teeth and it is made up of different types of bacteria.

The bacteria in plaque use sugars from our diet and produce harmful substances which can damage teeth and irritate the gums leading to tooth decay (caries) or gum disease.

The mild form of gum disease is called gingivitis. Over 50% of adults have some form of gingivitis. More severe gum disease, which can lead to tooth loss, is called periodontitis.

You can remove plaque by brushing your teeth and cleaning in-between your teeth.



Rinsing your mouth with mouthwash

If you use mouthwash, it is important that you use it at a different time of day to toothbrushing.

This is because the toothpaste and mouthwash can interact and lead to them being less effective.

Do not rinse your mouth immediately after using mouthwash.

Food and drink

Bacteria thrive on sugar and use it to produce acid, which can lead to tooth decay. Acidic foods and drinks can also cause tooth erosion.

- Limit the amount of sugary foods and drinks that you have. In particular, don't snack on sugary foods between meals.
- Try to reduce the amount of acid in contact with your teeth. Restrict fizzy drink (including fizzy water) and fruit juice consumption as these tend to be acidic. Otherwise, drink them quickly and with a straw to reduce the time your teeth are exposed to the acid in the drink.
- Wait at least an hour after eating or drinking anything before brushing your teeth.

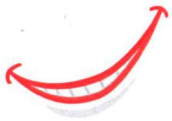
Smoking

Tobacco use can lead to tobacco/nicotine dependence and serious health problems such as lung and other cancers, heart disease and stroke. It can also lead to stained teeth, halitosis (bad breath), gum disease (periodontitis) and oral cancer.

Quitting smoking greatly reduces the risk of developing smoking-related diseases. You can ask your dental care professional for more information about help that is available with quitting smoking.

BSP
British Society of Periodontology
bsperio.org.uk

Written by Jessica Naylor



How should I be brushing my teeth?...

Brush your teeth twice a day.

It is best to brush them first thing in the morning, and last thing before bed, for two minutes each time.

Use a pea sized amount of toothpaste.

Ensure your toothpaste contains at least 1450ppm of fluoride.

Clean your teeth systematically.

Start with the inside surfaces of your lower teeth. Hold the brush at an angle towards the gum line so that the brush is touching the gum line and the tooth.

Use gentle circular movements of the brush on each tooth for a few seconds each and move the brush around to clean each tooth.

If using an electric toothbrush, hold the brush on the inside surface of each tooth for a few seconds.

Repeat on the outside surfaces of your lower teeth, then the in side and outside surfaces of your upper teeth.

Lastly, clean the biting surface of each tooth.

www.oralb.co.uk

Spit the toothpaste out, but don't rinse.

Toothpaste which stays on your teeth provides protection for several hours after you have brushed your teeth.

Cleaning in-between your teeth.

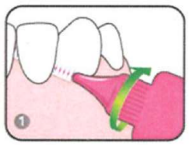
Plaque also forms in-between teeth where your toothbrush can't reach so it is important to clean between your teeth.

Your dental care professional will show you the best way to clean in-between your teeth.

One of the best ways to clean your teeth is to use small 'bottle' or 'TePe' brushes. These are called interdental brushes.

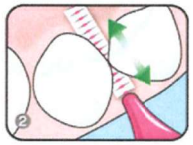
When using these brushes it is important to use the size that fits snuggly in each space, your dental care professional will tell you the correct size to use.

These small brushes should be used once each day between all of your teeth.



Insert the brush into the space between your teeth at the gum level, turn the brush slightly as you insert it.

Once inserted gently move the brush backwards and forwards 10 times.



Move the brush between all the spaces between your teeth in this way. Rinse the brush in water after you have finished using it.

www.tepe.com/uk

Cleaning your tongue.

You can use your toothbrush or a special tongue cleaner.

Place the brush or tongue cleaner as far back on your tongue as possible, apply firm pressure and pull forwards. Repeat this 3 times and then rise the brush or tongue cleaner in water.

Patient self reported Oral Health Questionnaire - Baseline Visit 1

If you have trouble completing this questionnaire, please ask a member of staff to assist you.

1. Thinking back over the past week, how many times did you brush your teeth….?
(Please tick one box to indicate on how many days you brushed your teeth at each time)

In the morning….

1 day	2 days	3 days	4 days	5 days	6 days	7 days

In the evening….

1 day	2 days	3 days	4 days	5 days	6 days	7 days

2. Which kind of toothbrush did you use the most often? *(Please tick one box only)*

Manual

☐

Power (Electric)

☐

3. A. In the past week, have you used any of the following mouth washes?
(Please tick the box of the mouth rinse you used or provide the name of the mouth rinse you use if it is not displayed here)

Listerine

☐

Colgate Total

☐

Dentyl

☐

Corsodyl 2%

☐

Corsodyl Daily

☐

Other/Not sure

☐

None

☐

Other: _____

B. If you have indicated you have used a mouth wash in the past week, please indicate on how many days you used it: *(Please tick one box to indicate the number of days)*

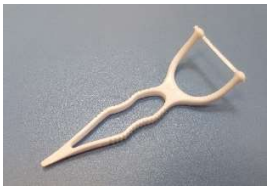
1 day	2 days	3 days	4 days	5 days	6 days	7 days

4. A. In the past week, have you used any of the following additional teeth cleaning aids? *(examples are shown below, please tick the box next to any you have used or if you use none of these, tick none)*

Dental Floss

☐

Flossettes



☐

Single tufted brush

☐

Interdental brushses (e.g TePe)

☐

Air flosser (e.g Phillips Airfloss Plus)

☐

Water flosser (e.g Waterpik)

☐

None

☐

B. If you have indicated you have used an additional cleaning aids in the past week, please indicate on how many days you used them: *(Please tick one box to indicate the number of days)*

1 day	2 days	3 days	4 days	5 days	6 days	7 days

5. Do you smoke or use any nicotine products? *(including the use of electronic cigarettes, patches etc)*

Yes ☐
No ☐

If you answered YES, please answer the following questions…

a. What nicotine product or substances do you use? _____
(Please specify if you smoke cigarettes, cigars, pipe, roll ups, vaping, use nicotine patches or chewing gum or recreational drugs)

b. How much do you use in a week? _____
(Please answer the number of cigarettes, or if pipes/roll-up: how many 'gms' do you use per week, number of patches/packs of chewing gum)

c. How long have you smoked or used this product for? _____

Patient self-reported Oral Health Questionnaire- Visit 2

If you have trouble completing this questionnaire, please ask a member of staff to assist you.

1. Thinking back over the past week, how many times did you brush your teeth….?

(Please tick one box to indicate on how many days you brushed your teeth at each time)

In the morning….

1 day	2 days	3 days	4 days	5 days	6 days	7 days

In the evening….

1 day	2 days	3 days	4 days	5 days	6 days	7 days

2. Which kind of toothbrush did you use the most often? *(Please tick one box only)*

Manual

☐

Power (Electric)

☐

3. A. In the past week, have you used any of the following mouth washes?
(Please tick the box of the mouth rinse you used or provide the name of the mouth rinse you use if it is not displayed here)

Listerine

☐

Colgate Total

☐

Dentyl

☐

Corsodyl 2%

☐

Corsodyl Daily

☐

Other/Not sure

☐

None

☐

Other: _____

B. If you have indicated you have used a mouth wash in the past week, please indicate on how many days you used it: *(Please tick one box to indicate the number of days)*

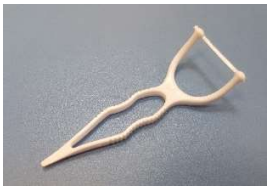
1 day	2 days	3 days	4 days	5 days	6 days	7 days

4. A. In the past week, have you used any of the following additional teeth cleaning aids? *(examples are shown below, please tick the box next to any you have used or if you use none of these, tick none)*

Dental Floss

☐

Flossettes



☐

Single tufted brush

☐

Interdental brushses (e.g TePe)

☐

Air flosser (e.g Phillips Airfloss Plus)

☐

Water flosser (e.g Waterpik)

☐

None

☐

B. If you have indicated you have used an additional cleaning aids in the past week, please indicate on how many days you used them: *(Please tick one box to indicate the number of days)*

1 day	2 days	3 days	4 days	5 days	6 days	7 days

5. Do you smoke or use any nicotine products?

Yes ☐
No ☐
Recently given up ☐

If you have recently given up smoking, please answer the following question…

Have you given up smoking since entering onto the study?_____
What inspired you to give up smoking?_____

Appendix 3 – Instructional videos on Oral Health Care Methods

Introduction

Good dental care is important to maintaining healthy teeth and gums.

It is important to know that bleeding gums are NOT normal and the appearance of blood in saliva following toothbrushing is something you should talk to your dental care professional about.

Other concerns you should talk to your dentist about include bad breath and loose teeth, or gaps appearing between your teeth.

It is also important to consider your general health and maintain a healthy weight and balanced diet.

Smoking and tobacco use can lead to dependence and serious health problems such as lung and other cancers, heart disease and stroke. It can also lead to stained teeth, bad breath, gum disease and oral cancer.

Quitting smoking greatly reduces the risk of developing smoking-related diseases. You can ask your dental care professional for more information about help that is available with quitting smoking.

It is important to use your toothbrush in the correct way to ensure you are cleaning all surfaces of your teeth to remove plaque.

Plaque is the name of the sticky deposit which forms on the teeth throughout the day, if it isn't removed it can lead to tooth decay and gum disease.

Brushing is recommended first thing in the morning, before breakfast, and last thing at night, before bed.

Ensure you are using a toothpaste which contains fluoride. This is important as it helps protect your teeth against decay and damage from acidic foods and drinks.

Manual Brushing Video Transcript

I am going to show you the correct way to use a manual toothbrush.

Firstly, ensure the brush you choose is soft or medium bristled and has a small head.

A fluoridated toothpaste is important as it helps protect your teeth against decay and damage from acidic foods and drinks. Apply only a small pea-sized amount of toothpaste to the brush.

Begin at the back of your mouth on the bottom or top, whichever side you feel most comfortable to start on.

It's best to start at the back and work on all the outside surfaces of the teeth before going back around to brush the biting and inside surfaces, so you don't miss any areas of the teeth.

Standing in front of a mirror and watching yourself brush also helps to ensure that you don't neglect any surfaces.

Angle the brush towards the gums at about a 45-degree angle, so that the bristles of the brush touch the gum line and the tooth surface at the same time - like this (demo).

Use circular movements and spend a few seconds on each tooth before guiding the brush over to the next, following the shape of each tooth as you work your way round.

You only need to use a massaging pressure with the brush, do not scrub or press so hard that the bristles of the brush splay (demo on model) Heavy handed brushing like this is damaging and can eventually result in the enamel wearing away or the gums receding.

Once you have brushed all the way round on the outside you should then move onto the biting surfaces of each tooth.

Finally move to the inside surfaces of the teeth. Hold the brush at 45-degree angle and use those circular movements again to guide the brush along the teeth all the way round the gum line.

For the lower teeth you need to make sure you push the tongue out of the way allowing the brush to reach right back to the molars- this is an area that is often missed.

It helps to hold the brush vertically when cleaning the inside surfaces of the front teeth as these can be difficult to access and are common areas for plaque and tartar build up.

Repeat this same process for the other arch of teeth, top or bottom, depending on where you started.

It is important that you clean your teeth in a systematic way to avoid missing any areas. It should take you at least two minutes to clean every surface of each tooth.

When you have finished brushing, spit out any excess toothpaste but don't rinse your mouth out afterwards as toothpaste which stays on your teeth provides protection for several hours afterwards.

It is important to replace your tooth brush every 3 months as the bristles will begin to breakdown and are no longer as effective. You can replace it sooner if you think the bristles are splayed or damaged.

Powered Tooth brushing video transcript

I am going to show you the correct way to use a powered toothbrush.

When choosing a powered brush, choose a rechargeable electric toothbrush. There are many different types and brands available.

The two main types of electric toothbrush are oscillating brushes such as an Oral B powered brush, which have small round heads that rotate and pulse, or a sonic brush, like a Phillips Sonicare, which has a rectangular shaped head.

The power settings can often be altered on these brushes. You should use a setting which is strong enough to effectively remove the plaque from the surfaces of your teeth without having to apply too much force.

Some brushes come with an indicator which tells you if you are pressing too firmly. These are useful if you have been advised by your dentist that you may be brushing too hard and help avoid further damage to the tooth surface or gum recession.

Standing in front of a mirror and watching yourself brush also helps to ensure that you don't neglect any areas

Begin at the back of your mouth on the bottom or top, whichever side you feel most comfortable to start on.

It's best to start at the back and work on all the outside surfaces of the teeth then go back around the biting and inside surfaces, so you don't miss any areas.

Angle the brush towards the gums at about a 45-degree angle, so that the bristles of the brush touch the gum line and the tooth surface at the same time like this.

Don't turn the brush on until it is in contact with the teeth to prevent your toothpaste from splattering everywhere.

Turn the brush on and hold it steady against the tooth and gum for a few seconds, then move onto the next tooth

Adjust how you hold the brush against the tooth depending on the shape of the area you are brushing.

Let the brush do the work and focus on placing it correctly.

Don't be tempted to use a circular movement similar to manual brushing as this will reduce the effectiveness and defeat the purpose of using a power brush.

Most power brushes will have a timer that will indicate when two minutes has passed, however you should ensure you spend a few seconds on each tooth surface to make sure you have spent enough time on each area.

When you have finished brushing, spit out any excess toothpaste but don't rinse your mouth, as toothpaste which stays on your teeth provides protection for several hours afterwards.

Electric brushes need to be recharged regularly to ensure it is working effectively.

You should replace the head of your brush every 3 months, as the bristles will breakdown and are no longer as effective. You can replace it sooner if you think the bristles are splayed or damaged.

Transcript For Interdental Cleaning

Plaque is the sticky film that builds up on your teeth throughout the day. It contains bacteria which cause gum disease and tooth decay. Gum disease starts in the spaces between your teeth.

Brushing your teeth properly removes plaque from the bulk of the tooth, but a toothbrush cannot reach properly in between the teeth to clean these areas thoroughly (show on model).

These areas in between the teeth can only be cleaned properly by using interdental brushes or where the gap is too tight for interdental brushes, floss.

As plaque is soft, it can easily be removed at home but if it isn't cleaned away, the minerals in your saliva cause it to harden into a yellow deposit called calculus, more commonly known as tartar.

Once plaque has turned into calculus, it is too hard to clean away with any brushes or floss and only your dental care professional can remove it using special instruments, called scalers.

Any plaque and calculus build-up between your teeth irritates the gums and you may notice they bleed when you brush, this is called gum disease.

It is important to realise that bleeding gums are not normal and the appearance of blood in saliva following toothbrushing is something you should talk to your dental care professional about.

To ensure your gums stay healthy it is important that you make time to clean between your teeth once a day.

I am going to demonstrate the use of interdental brushes and floss.

For the interdental brushes the colours represent the different sizes of brush.

You may need more than one size of brush to effectively clean between all of the teeth in your mouth as some gaps may be bigger than others.

You should use the largest brush size you can fit into the gap comfortably.

If the brush is a little bit loose you can work up to a larger size. Your dental care professional can help you find the correct size to use.

These brushes should be used between all of your teeth, at least once a day.

To use, insert the brush at the tip of the triangle of gum between the teeth (demo). Turn the brush slightly as you insert it.

Once inserted, vigorously move the brush backwards and forwards at least 20 seconds before removing it.

Move the brush between all the spaces between your teeth in this way.

Rinse the brush in water after you have finished using it.

Never force the brushes into a space. If you have very tight gaps between the teeth or very crowded teeth you may not be able to fit even the smallest size through.

If this is the case, you should use floss instead.

Flossing

To receive the maximum benefits from flossing, it's important to use the proper technique.

Start with a good length of floss of about this length (show length), and wind most of the floss around each middle finger, leaving an inch or two of floss to work with.

Hold the floss tautly between your thumbs and index fingers, slide it gently between your teeth towards the gum so the floss goes beneath the gum line.

Then use your hands to curve the floss around the tooth and slide it back away from the gums keeping the floss in contact with the tooth the whole way.

Never snap or force the floss into the gums, as this may cut or bruise delicate gum tissue. Avoid using a sawing action to prevent any damage to the teeth or gums.

As you move from tooth to tooth, unwind and rewind the floss around your fingers to use clean sections each time.

If you struggle using floss like this, you can also buy flossettes (demo) which work in the same way except the floss is already mounted for you.

Appendix 4 - Gum Health Improvement Patient Agreement

Gum Health Improvement Patient Agreement

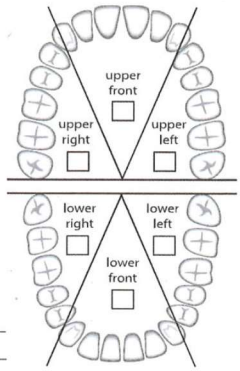
Your gum health score is shown here

Gum health is important to prevent gum disease. There are two main types of gum disease and you have been diagnosed with:

- ☐ ***Gingivitis – which is reversible gum disease but can lead to:***
- ☐ ***Periodontitis – which can cause tooth loss but can be controlled***

Periodontitis slowly destroys the bone that holds your teeth in the jaw and unless it is treated, the end result is that the teeth become loose and are eventually lost.

The most important thing you can do is to learn how to thoroughly clean the Dental Plaque build up in between your teeth and along the gums.



Plaque score: _____

Bleeding score: _____

Mouth divided into 6 areas. Understanding your score

Score 0 = Health Score 1-2 = Gingivitis Score 3-4 = Periodontitis

Self-care plan:

For better gum health we recommend:

- ☐ Cleaning thoroughly between the teeth or "interdental cleaning" using the right size interdental brush or floss as demonstrated to you.
- ☐ Recommended interdental brush sizes:
- ☐ Brushing your teeth and gums thoroughly twice a day using a fluoride toothpaste as demonstrated to you
- ☐ Using a single-tufted brush around the gum margins and between your teeth once / twice daily
- ☐ Stopping smoking. Smoking puts you at higher risk of developing Periodontitis and treatment will not work as well and you are more likely to loose your teeth
- ☐ Diabetes check. Diabetes is a risk factor for Periodontitis
- ☐ Stopping oral nicotine e.g. E-cigarettes, vaping, nicotine lozenges, sprays or gum.
- ☐ Other _____

Your gum health will be re-assessed in _____

Consent

The Dental team is here to help you keep your gums and teeth healthy. We will work with you to show you the best way to clean your gums and teeth thoroughly. This is set out in your care plan above. The biggest impact on Periodontitis is having a clean "plaque free" mouth. Any treatment that we do in the surgery will not work as well unless it is supported with thorough plaque removal at home. Your plaque score should ideally be below 20% and your gum bleeding score should be below 10%.

For this reason, we cannot begin advanced treatment for the gum disease until we can see you are able to achieve good levels of plaque control. We will do our best to help you achieve this, but the main responsibility lies with yourself. If you follow the self-care plan we will see an improvement in your gum health. To put it simply Periodontitis is beaten in the bathroom, not in the dental surgery.

Signed: _____ (Dentist/Dental Hygienist/Dental Therapist)

Patient name: _____ Signed: _____ (Patient)

Date: _____

Patient Attitudes to Oral Health Questionnaire
Pre-consultation Visit 1

On a scale of 1 to 10, with 1 as 'Not at all' and 10 as 'extremely so' please rank the following statements accordingly:

1. Do you think bleeding gums and gum disease is a serious health concern

1 2 3 4 5 6 7 8 9 10
Not at all — Extremely so

2. If my bleeding gums are left untreated the likelihood that I will develop gum disease in the future is high

1 2 3 4 5 6 7 8 9 10
Not at all — Extremely so

3. Following my Oral Health plan over the next 12 weeks will improve the health of my mouth and reduce my risk of developing gum disease

1 2 3 4 5 6 7 8 9 10
Not at all — Extremely so

4. I know I can follow my Oral Health plan over the next 12 weeks

1 2 3 4 5 6 7 8 9 10
Not at all — Extremely so

5. Following my Oral Health plan will be difficult to do.

1 2 3 4 5 6 7 8 9 10
Not at all — Extremely so

6. My gum disease concerns me

1 2 3 4 5 6 7 8 9 10
Not at all — Extremely so

7. I will do my best to follow my Oral Health plan over the next 12 weeks

1 2 3 4 5 6 7 8 9 10
Not at all — Extremely so

Appendix 5b - Patient Attitudes Questionnaire – 3 month follow-up

Patient Attitudes to Oral Health Questionnaire
3 month follow-up

On a scale of 1 to 10, with 1 as 'Not at all' and 10 as 'extremely so' please rank the following statements accordingly:

1. Do you think bleeding gums and gum disease is a serious health concern

1	2	3	4	5	6	7	8	9	10
Not at all									Extremely so

2. If my bleeding gums are left untreated the likelihood that I will develop gum disease in the future is high

1	2	3	4	5	6	7	8	9	10
Not at all									Extremely so

3. Following my Oral Health plan over the next 12 weeks will improve the health of my mouth and reduce my risk of developing gum disease

1	2	3	4	5	6	7	8	9	10
Not at all									Extremely so

4. I know I can follow my Oral Health plan over the next 12 weeks

1	2	3	4	5	6	7	8	9	10
Not at all									Extremely so

5. Following my Oral Health plan will be difficult to do.

1	2	3	4	5	6	7	8	9	10
Not at all									Extremely so

6. My gum disease concerns me

1	2	3	4	5	6	7	8	9	10
Not at all									Extremely so

7. I will do my best to follow my Oral Health plan over the next 12 weeks

1	2	3	4	5	6	7	8	9	10
Not at all									Extremely so

Appendix 6a – DFT Oral Health questionnaire – pre training

Oral Hygiene Advice Training Day
Pre-Training Questionnaire

1. Which dental school did you qualify from?

   _____

For the following questions, please circle one number to indicate how strongly you agree with each statement.

2. I feel my undergraduate training prepared me to deliver oral hygiene advice in general dental practice.

1	2	3	4	5
Strongly disagree		Somewhat agree		Strongly agree

3. I am confident in giving oral hygiene advice in general practice.

1	2	3	4	5
Strongly disagree		Somewhat agree		Strongly agree

4. I am confident giving oral hygiene advice in the time slots I am allocated in general practice.

1	2	3	4	5
Strongly disagree		Somewhat agree		Strongly agree

5. What are your strongest concerns about delivering oral hygiene advice in general dental practice? *(e.g time constraints, availability of teaching aids)*

   _____

   _____

   _____

Appendix 6b – DFT Oral Health questionnaire – Post training

Immediate Post-Training Questionnaire

Please circle one number to indicate how strongly you agree with each statement.

1. I feel more confident in giving oral hygiene advice (OHA) following the training I received today

1	2	3	4	5
Strongly disagree		Somewhat agree		Strongly agree

2. I felt there was a gap in my OHA knowledge before the training day.

1	2	3	4	5
Strongly disagree		Somewhat agree		Strongly agree

3. I will be delivering my OHA differently following completion of this training

1	2	3	4	5
Strongly disagree		Somewhat agree		Strongly agree

4. I feel more confident to give OHA in the time slots I am allocated in general practice following this training.

1	2	3	4	5
Strongly disagree		Somewhat agree		Strongly agree

5. There has been a change in my knowledge and behaviour for giving OHA to my patients after the training.

1	2	3	4	5
Strongly disagree		Somewhat agree		Strongly agree

Appendix 6c – DFT Oral Health questionnaire – End of Study (3 months post training)

3-month post-training questionnaire

Please circle one number to indicate how strongly you agree with each statement.

1. I feel confident in giving Oral Health Advice (OHA) during the time slot I am allocated in general practice following the study training.

1	2	3	4	5
Strongly disagree		Somewhat agree		Strongly agree

2. Having completed the training, I feel more confident in giving OHA.

1	2	3	4	5
Strongly disagree		Somewhat agree		Strongly agree

3. I have given OHA differently following completion of the training.

1	2	3	4	5
Strongly disagree		Somewhat agree		Strongly agree

4. There is a change in my knowledge and behaviour for giving OHA to my patients after the training.

1	2	3	4	5
Strongly disagree		Somewhat agree		Strongly agree