

## MODERN GUIDED BIOFILM THERAPY (GBT), **“A NEW APPROACH - A GAME CHANGER”**

For years very little has changed in the basic approach to the prevention of dental diseases including both tooth decay and gum disease. The simple message for all patients has always been, and remains the same:

***“eat less sugars and clean teeth better!”***

This message still stands.

What has changed at NQ Surgical Dentistry is the **way we deliver preventive dental care** making it:

- far more comfortable,
- minimally invasive
- more effective
- and reducing anxiety for patients.

### **The past (up to late 1980's)**

Many patients remember the days of dentists and hygienists scaling your teeth using hand instruments followed by a polish with a rotating brush or rubber cup and an abrasive paste. This was called a scaling and dental prophylaxis or a “*prophy*”.

These hand-scalers had sharp edges used to “scrape off” plaque and tartar from the tooth and root surfaces. It was often uncomfortable, always noisy, scratched tooth and filling surfaces, and frequently resulted in bleeding from the gums and caused discomfort that took some days to resolve. This was considered normal until the 1990's when technological advances made scalers a thing of the past.

Scaling and tooth polishing was only effective on the accessible areas of the tooth surfaces, but it was **ineffective in the inaccessible sites** located under the gum margins or between teeth. Often the gum margins suffered abrasion from the rotating cups or brushes leaving them sore and bleeding.

Sadly the patient experience was uncomfortable and rarely described as pleasant providing little incentive for the patient to repeat the ordeal in 6 months time!

The clinical outcome of clean teeth satisfied the dentist or hygienist, but the “biological price” paid by the patient in terms of pain, bleeding and anxiety was not worth the degree of benefit, perceived by the patient. **Thankfully this is now confined to history.**

**The result was patients often did not come back, so their mouths returned to the same state as before with a build-up of plaque and calculus, new decay and continued gum disease and infection.**

### **More recently (1980's-2015)**

With the development of high frequency vibrating instruments, available since the 1980's, the use of hand instruments was largely replaced in modern practices.

Firstly came the ultrasonic scalers, then the air-scalers, finally being replaced with the next generation of instruments known as piezo-scalers.

After the removal of tartar (calculus), some stain would still be present on the teeth requiring rotating rubber cups and brushes with polishing paste. This would remove the remaining "accessible" stains, although often leaving behind stains that cannot be accessed and hopefully could not be seen.

Those less accessible surfaces with remaining calculus, plaque or stain, would still be rough and provide the ideal surface to attract new plaque and begin the development of more mature, disease-forming bacterial plaque and calculus once again but it was hidden from view. However, gum disease continued.

### **Today (2018 onwards)**

Nowadays, we are moving towards a truly "patient-focused" system that allows us to avoid the use of instruments that cause damage to the tooth and filling surfaces, implant surfaces or even the soft tissues of the surrounding gum margins.

**Modern techniques offer preventive dental care without damaging the tissues and without discomfort thereby reducing patient anxiety.**

**New technology has arrived with the advent of the EMS Piezon, AirFlow and PerioFlow systems. Put simply, the future has arrived!**

We now have **new technologies and new rationales** for what we do that genuinely focus on the patient and their experience. Using an air-abrasive system and Piezo-scalers with ultra-high frequency vibration and highly developed intuitive technology to optimise their effectiveness and patient comfort, the new EMS Piezomaster can deliver the **optimal degree of energy** output required **to remove calculus** while **blocking pain sensation** and **minimising the power output** to **avoid damaging the tooth surface**. The tips can sense the type of deposits on the teeth and provide only the level of energy required to remove it avoiding the use of too much power constantly causing damage to teeth and fillings and stimulating the pain fibres of the nerves.

**Dental cleaning using the most modern equipment and techniques should only be a relaxing and pleasant procedure.**

## **THE ENEMY OF A HEALTHY MOUTH**

The word “*plaque*” describes “*the soft, accumulations of millions of live bacteria that exist on all the surfaces in the mouth in a sticky film of protein*”.

Plaque is derived from a combination of the **750 species of bacteria** that live in the human mouth. Plaque forms initially with the laying down of a film of protein on the oral surfaces and to this surface, bacteria stick. This is a constantly developing material called a **biofilm**. The protein that makes up the matrix for this biofilm is derived from saliva and from fluid produced by the gum tissue galled gingival crevicular fluid.

**This plaque (biofilm)** is extremely sticky and adheres to the teeth, gums, cheeks, tongue, fillings, dentures, orthodontic brackets, indeed anything that is found in the mouth.

### **Biofilm is the root of all evil in the mouth!**

The biofilm is the cause of dental decay, gum disease and infections like wisdom tooth infections, dental abscesses, and the release of oral bacteria into the blood stream (bacteraemia) and the development of bacterial endocarditis (infection of the heart valves).

Biofilm removal can be extremely challenging primarily because it is so sticky and being almost tooth coloured, it is hard to see on the tooth surface unless the tooth is dried thoroughly and you have good lighting and ideally observe with magnification.

Incorrect or inefficient tooth brushing often leaves considerable quantities of biofilm still present in the mouth. However, because it is difficult to see, patients are often completely unaware of its presence, but its damage and disease activity continues.

### **Biofilm protects the bacteria**

The biofilm protein matrix offers the oral bacteria an enormous degree of protection against both the mechanical disruption of tooth-brushing and against antibacterial chemicals used in mouthwashes and against antibiotics. Most mouthwashes have very little beneficial effect on bacterial numbers or on plaque accumulation and activity and some cause staining of the teeth and the tongue.

- The structure of biofilm protects the oral bacteria from toothbrush disruption due to its strong adherence to the tooth surface.
- The biofilm also offers a protective barrier against chemicals incorporated into toothpastes and mouthwashes, to help patients achieve good oral hygiene.
- Finally, biofilm acts like a barrier protecting the bacteria against antibiotics being used to control infection.

**A NEW APPROACH – THE FUTURE IS HERE TODAY!  
“GUIDED BIOFILM THERAPY”**

Before we outline the order of treatment, let's consider why it is difficult to remove all the small deposits of calculus from the teeth and the root surfaces.

Clearly, one reason is that we cannot easily see these small deposits of calculus because they are covered in a layer of biofilm (plaque). Therefore the first task should be to remove the biofilm as much as possible making identification of calculus as easy as possible and thereby improve our effectiveness at its removal.

### **What does biofilm look like?**

Biofilm is a creamy coloured, sticky gel-like material, closely matching the colour of the underlying tooth or root surface. It is difficult to see and it obscures the underlying calculus deposits, stain and even areas of dental decay.

### **A logical and modern approach**

The most logical first treatment step would be to **make the biofilm more visible by staining it a bright colour**, then remove the biofilm. This reveals the calculus deposits beneath, to allow for their effective removal and the identification of any previously hidden dental decay.

This is what is described as *"Guided biofilm therapy (GBT)"*.

### **GBT STAGE 1: Examination and diagnosis *"for all patients to maintain a healthy mouth"***

A thorough dental examination includes the observation of all structures in the mouth including the teeth, the tooth supporting structures including the gums and the bone around the teeth, and finally all the oral soft tissues including the cheeks, floor of the mouth, tongue and the lips.

### **Periodontal assessment – gum examination**

Part of this screening should involve an assessment of the periodontal tissues. This can be achieved both by assessing accurate X-rays and by performing periodontal probing examination to identify the presence of "pockets" under the gum margins that provide a protected environment for the biofilm to develop and mature.

Periodontal probing also identifies where there is periodontal inflammation and gum disease. However, if there is severe gum disease with bone destruction and deep pockets present, periodontal probing can be extremely uncomfortable. Therefore, once the presence of **destructive gum disease has been confirmed on the X-ray, there**

is little benefit to the patient or the dentist/hygienist by probing the inflamed and sore gums.

Detailed examination and charting can be delayed until the end of the initial phase of treatment and much of the inflammation has been eliminated leaving the gum firm and far more comfortable to examine. **This is simple common sense!**

Diagnosis of dental disease from a detailed examination may identify any of the following:

- Health soft tissues and healthy teeth
- Dental caries – tooth decay
- Gingivitis – inflamed gums
- Periodontitis - inflammatory loss of bone around the teeth
- Peri-implant mucositis – inflamed gums around a dental implant
- Peri-implantitis – inflammatory loss of bone around a dental implant

#### **STAGE 2:**

**Plaque disclosure – staining the biofilm**  
*“for all patients to maintain a healthy mouth”*

To better identify the biofilm, it must be “disclosed” using a dye. This allows the dentist or hygienist to demonstrate the presence of the now highly visible stained biofilm very clearly to the patient, in a mirror or using a camera or video. *After all, if you haven’t seen it, why would you believe there is a sufficient quantity to cause dental disease? At this stage many patients are surprised!*

#### **STAGE 3:**

**Motivation and oral hygiene instruction**  
*“for all patients to maintain a healthy mouth”*

The next stage is to ensure the patient understands why past methods of cleaning have allowed biofilm to develop causing gum disease despite whatever method they have used to clean their teeth. Nobody chooses to have dirty teeth! Most patient firmly believe that they have been doing a good job keeping their teeth clean. Sadly relatively few of us do a great job cleaning teeth and gums. Advice on home care will follow after the clear demonstration of biofilm to the patient.

Cleaning advice and support should include a demonstration of a high frequency vibratory brush on a model initially. This is usually done at the consultation appointment with Dr Priestland. Then later at the first dental hygienist appointment, Sharon will demonstrate the same brushing technique in the patient’s own mouth.

The **Philips Sonicare system** provides high frequency vibration of the brush filaments (32-62 MHz depending on the model chosen). Any vibration above 32MHz will prove to be very effective in disrupting the biofilm if it is carried out correctly.

**Correct high frequency home brushing is the key** to thorough biofilm disruption. The use of high frequency vibratory tooth brushing is fundamental, both to preventing dental decay, successful treatment of gum disease and the maintenance of a healthy mouth.

Generally vibration frequencies in excess of 30,000 times a minute are required to effectively disrupt and remove biofilm. There are very few brushes available that can achieve this frequency.

We strongly advise patients **NOT TO USE round head brushes** that operate by counter-rotation as they are extremely ineffective between the teeth and under the gum margins.

Currently we advocate the use of the **Philips Sonicare brushes**. They are all effective at varying costs. The dentist or hygienist can then support the patient in their learning of this new technique so they can initiate the new cleaning at home after the appointment and continue to use this technique into the future.

**STAGE 4:**  
**Use of the EMS AIRFLOW – air-abrasive system**  
*“for all patients to maintain a healthy mouth”*

Now the **EMS AIRFLOW** can be used to remove all the disclosed (stained), highly visible biofilm, stains and immature calculus from the tooth surfaces using a jet powder system containing EMS Airflow Plus powder

For patients who suffer from extreme tooth sensitivity, they may be given local anaesthetic to ensure their complete comfort throughout their periodontal treatment. This is optional for all patients.

This air/water-abrasive jet can access all sites around teeth, fillings, orthodontic brackets, in the tooth pits and fissures on the biting surface of the teeth, and around rough tooth edges where enamel fractures have occurred. It can safely be used just under the gum margins up to a depth of 4mm completely pain-free.

There is no need for rotating rubber cups or brushes with an abrasive polishing paste after AIRFLOW as the powder polishes at the same time removing plaque, softer calculus and stain. This greatly reduces the time required for treatment. We understand that less time in the dental-chair is greatly appreciated by all patients and greater comfort means recall appointments are no longer something to fear.

#### STAGE 5:

##### Use of the EMS PERIOFLOW

*“for all patients who have suffered destructive gum disease with bone loss and periodontal pockets”*

The next stage is to remove any plaque and calculus off the root surfaces that are located in pockets around teeth deeper than 4mm.

If you were identified as a patient who has experienced destructive gum disease, your dentist or hygienist will explain to you:

- a. how the bone level reduction around your teeth takes place as a result of a heightened inflammatory response,
- b. and as a consequence, periodontal pockets develop that can harbour bacteria and favour the growth of a disease-causing biofilm,
- c. and that these pockets offer a protected environment for the biofilm,
- d. thereby encouraging the progression of gum disease and further bone loss around the teeth leading to infection, abscesses, loose teeth and tooth loss.

*\* This detailed information is available in our leaflet entitled “Gum Disease – the basics explained”.*

**EMS PERIOFLOW** uses an advanced specially designed tip to access the pockets painlessly and apply a jet of two streams of ERYTHRITOL fine abrasive powder (14 microns particle size) to remove the plaque and calculus deposits from the inner surfaces of the pocket including the root surface and the adjacent soft gum surface.

The EMS PERIOFLOW can be used to within 1-2mm of the depth of any pocket with a maximum penetration depth in deep pockets of up to 9mm.

Once again EMS PERIOFLOW is pain-free. It allows patients an anxiety free appointment and improves the overall dental experience reducing anxiety over future recall visits.

#### STAGE 6:

##### Use the PIEZON PS (Perio slim).

*“for all patients with hard and adherent calculus”*

The PS tip is used for patients with teeth and the PIEZON PI (Peri-implant) tips are used around implants.

For patients visiting our practice for the first time, with either untreated severe gum disease (chronic or aggressive periodontitis), or those patients who have received incomplete periodontal treatment previously, some deposits of very hard and adherent calculus may remain in pockets or around the gum margin area of teeth.

This will prevent improvement in their gum disease and must be completely removed for healing to start.

These deposits may be highly mineralised, extremely porous and adherent to the tooth surface. They also contain some highly toxic bacterial waste products that are potent stimulators of the destructive inflammatory response that is responsible for the destruction of the bone supporting the teeth. Therefore a final stage is required to remove these disease-causing deposits often found deep within these periodontal pockets. This is why the Piezon PS or PI tips are used.

**There are 3 sound reasons to accept this new approach: its quicker, it's more comfortable and it's more effective.**

**STAGE 7:**  
**Quality control – re-check for residual deposits and decay**  
*“for every patient”*

After the completion of your Guided Biofilm Therapy, your on-going future genetically driven susceptibility to gum disease remains unchanged as this is primarily determined by your DNA handed down to you by your parents.

The **inflammatory activity** with the periodontal tissues is **dependent on the stimulation and inflammatory activation of bacterial toxins and bacterial waste** products. Effective cleaning by the patient on a daily basis, and **an absence of plaque will therefore allow the inflammation in the gums to resolve**, allow healing to take place and prevent the return of the destructive inflammatory response.

**Home care is fundamental**

Once your current active disease is stabilised and inflammation largely resolved, it is imperative that you maintain the highest standard of biofilm control at home every day. This will depend on your using an effective method of biofilm destruction and we strongly advise the use of the **Philips Sonicare system**.

You will also require **regular professional support** by your dentist/periodontist and/or hygienist, including **preventive therapy in the future**, to stay healthy.

The regularity of your preventive therapy will depend on both the degree of your genetically determined susceptibility to periodontal disease, and the standard of home cleaning that you are able to carry out. On-going assessment of disease activity and patient control must continue in the future.

**STAGE 8:  
SCHEDULE A RECALL ASSESSMENT  
“for all patient”**

All patients will benefit from Guided Biofilm Therapy. This approach to achieving and maintaining a healthy mouth has been demonstrated in research studies to be well-tolerated by patients and successful in controlling dental disease including dental decay and periodontal disease. **Sound professional support accompanying thorough and effective daily homecare is key to maintaining good dental health.**

Once this treatment protocol has been performed, it is fundamental that on-going supportive therapy is provided on a regular basis. How often that care is provided will depend on both the degree of susceptibility to dental disease and how effective the home biofilm control is. Your dentist/periodontist or hygienist, in providing you with a future maintenance schedule, will take these factors into account and you will have an input into the frequency of recall.

Recall may vary from 3 to 9 monthly. Your care is tailored to your specific risk factors and therefore a plan needs to be agreed with you on when the next scheduled recall appointment will be required. This is a decision in which the patient is closely involved.

**STAGE 9:  
MAINTENANCE CARE PLAN  
“for all patients to maintain a healthy mouth”**

This logical, patient-friendly, preventive approach has been developed by the *European Federation of Periodontology* (EFP) combining **high quality home care** using **high frequency brushing, tongue-care** (involving brushing the tongue to remove the reservoir of bacteria that live there) and the use of **floss/airfloss or Piksters**.

These home-based procedures must be backed up with **professional support** using the **Guided Biofilm Therapy** system that has been outlined in this leaflet and can be summarised as:

- Examination and diagnosis
- Disclosure (staining) of dental plaque to identify it clearly
- Educate, demonstrate and support patients to use high frequency vibratory brushing at home using a *Philips Sonicare brush*
- Perform AIRFLOW on tooth surfaces and up to 4mm under gum margins
- Perform PERIOFLOW in pockets more than 4mm deep
- Perform PIEZON (PS/PI) cleaning of resistant calculus that remains

- Reassessment of the whole mouth, checking for any previously invisible signs of dental decay, then application of re-mineralising therapy (ToothMousse – Casein phospho-peptide and amorphous calcium phosphate CPP-ACP) to repair early decay and prevent later tooth surface hypersensitivity after cleaning.
- Schedule the next recall appointment taking into account risk factors
- Future regular maintenance care plan.

We hope this detailed document clearly explains the scientifically proven, well-tried and tested “Guided Biofilm Therapy” approach to the treatment of dental disease, but especially to the successful treatment of gum disease (chronic periodontitis).

If you are suffering from bone loss around your teeth, then this treatment will achieve control of the condition and prevent further progress. You will be provided with a second information leaflet from our extensive Patient Handout series entitled “Gum Disease – The basics explained”. This should be read in conjunction with this explanation of treatment.