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# 'Selfies' – an Effective Communication Aid to Solve Periodontal and Implant Diseases

**Abstract:** If a picture paints a thousand words, then 'selfies' can be a very effective communication aid in getting patients to understand and accept their responsibilities for their periodontal diseases and/or their implant health maintenance.

**CPD/Clinical Relevance:** Once patients have a well-lit visual record on their mobile phones of where their real gum problems are located and understand their responsibilities in solving these, they are much more likely to clean effectively around their problem areas including their implants. Mouthwashes are not the solution for periodontal problems, in spite of very dubious advertising claims. Effective, repeated, physical removal of their bio-film is the key message. Having a long-term record on their mobiles of how to remove their pathogenic plaque more effectively is a powerful way to reinforce that message.

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Patients often cannot see, or remember, where they have plaque/biofilm unless it is made clearly visible and memorable for them, by means of disclosing or the identification of marginal inflammation.

Generally speaking, most people are interested in how they look in most photographs. Taking multiple 'selfies' on their own smartphones which record their gum problems graphically is a powerful way to show patients where their plaque/biofilm is present and is causing their disease. This can be helped by using a device (Smile Line MDP) to hold patients' own mobile phones securely and this neat and inexpensive device provides decent illumination of the less visible plaque/biofilm areas inside their mouths (Figures 1 and 2).

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Once a clinician recognizes that there is a periodontal problem present, it is often helpful for patients to have multi-coloured disclosing solution applied directly to their problematic areas in order to help them to visualize the startling colour changes of their own stained plaque. Photographing their appearance at that point with their camera on their smartphone cameras gives them a very good idea and helps them to remember where their problems are.

This graphic visualization of the disclosed plaque (or visually obvious marginal inflammation) and an appropriate explanation of its seriousness helps patients to understand that it is **their** plaque/biofilm that has caused their gum problems and to remember that it will cause **them** ongoing and future problems unless **they** sort out their cleaning more effectively (Figures 3a and b).

If patients cannot visualize where their plaque has accumulated, and see where it has caused inflammation, then they cannot reasonably be expected to develop their habit of removing their

strongly adherent biofilm effectively on a daily basis.

## Why patient 'selfies' can help

Many people are now emotionally attached to their various mobile devices. Many are addicted to their smartphones. Some suffer 'nomophobia', meaning that they get very anxious if they are deprived of it for even moderate periods of time, or mislay it, or have it stolen. Given the ubiquitous presence of smartphones in modern society, most of which have sophisticated cameras, this allows for decent, well-lit photographs to be taken on patients' own devices with a customized lighting system, which can help them to remember where their problems are present (Figure 3).

Many patients can understand what inflammation looks like in the mouth when it is pointed out to them, but many will require disclosing of their biofilm. The dental professional can more effectively target a patient's real problem areas with multi-coloured disclosing solution



**Figure 1.** The Smile Line device holding a mobile phone showing the lighting system.



**Figure 2.** The Smile Line device showing the securing mechanism for the patient's mobile phone with its integrated camera.



**Figure 3. (a, b)** The patient's biofilm/plaque was disclosed to give a record on his mobile phone of where their problems were located.

delivered with a cotton pledget, held in dental tweezers, rather than using an indiscriminate disclosing tablet. Patients can then see their graphically coloured plaque, perhaps for the first time, and appreciate



**Figure 4.** Using an interdenal brush rather than a periodontal probe to record the bleeding emphasizes where patients need to clean more effectively if they want to control their gum problems.



**Figure 5.** A picture taken on his own mobile phone of a patient who believes that he has good periodontal health.

where their problems really are. The benefit of the personalized photographic evidence which can now be held and readily available later to them on their mobile devices is obvious (Figure 4).

As a consequence of being able to view this visually striking photographic evidence as often, or whenever, or wherever, they wish, means that sensible patients are more likely to accept their responsibilities for removing their own plaque at home without a clinician there to nag them. In other words, this encourages an 'internal locus of control' by developing a sense of self-efficacy. In effect, this means that they can be encouraged early on to solve their own problems rather than expecting, or hoping that, someone else, such as a hygienist, or a dentist, or a periodontist, will do the important cleaning for them. Copies of any such photographs held by the clinician may also provide a useful medico-legal record of patients' gingival appearance at that point and their adherence, or lack of it, to oral



**Figure 6.** Palatal view of a patient who 'brushes twice a day', uses a mouthrinse and believes that his cleaning is very good.



**Figure 7.** A picture taken on the patient's own mobile showing bleeding due to his previously ineffective cleaning. This patient quickly understood how a long-handled, angled interdenal brush used from both the inside and the outside of the teeth could achieve better cleaning than using an expensive but largely useless mouthrinse.

hygiene advice that was given.

### First impressions count

Patients' first impressions of clinical encounters are important. The first impression that most patients need to get is to see and understand where the problems are in their mouths and what they need to do to solve their own problems. Graphic, well-lit photographs, held on their smartphones, provide these powerful messages. Images of the correct removal techniques required for them to solve their plaque accumulation problems can act as an ongoing reminder to reinforce the need for them to look after their own long-term oral health (Figures 5, 6 and 7).

Any areas of gingival recession, especially in patients with a thin gingival phenotype, can be easily monitored by patients themselves once they have their own photographs to refer to whenever they wish.



**Figure 8.** A picture taken on a patient's own mobile showing the bleeding as a sign of his active inflammation. The use of an interdental brush as a diagnostic aid to show this, rather than using a periodontal probe, initially transfers the responsibility to the patient to address his own problems quickly.

### 'Selfie' videos demonstrating how to clean more effectively

It is strongly recommended that a series of customized 'selfie videos' be made of patients using the correct interdental and interspace brushes in the right way. These correctly illuminated short videos can then be kept on their smartphones, possibly along with timed reminders, which they can set for themselves to use, as appropriate, to fit in with their lifestyles.

The fact that they have these pictures readily available on their smartphones in the privacy of their own homes can help patients to be much more effective with their own home cleaning regimen (Figure 7). The Smile Line MDP device can help in this process because well-lit photographs of their 'difficult to see' problem areas at the back of their mouths can be viewed by them well after the consultation visit is over. Many patients are stressed by lying back in the dental chair holding a patient mirror in their hands, usually without effective illumination and often with some stranger hovering over them with sharp dental instruments. Their stress may well be compounded by the inappropriate probing of inflamed gingival tissue, which can be exquisitely painful and which is, under such circumstances, of very questionable accuracy or benefit. Probing should probably be avoided, especially in the new patient who presents with widespread inflammation (Figure 7), although the pressure to record a highly

questionable BPE in such circumstances is recognized. The photographs, however, will act as a record that the clinician recognized the existing periodontal problems and did something sensible to draw the attention of the patient to these.

### Getting the responsibility message across quickly to patients with periodontal problems

A smart and effective approach is to explain to new patients early on (and before any probing) that they will be helped by seeing and understanding what is causing their particular problems. A series of explanatory photographs on their mobile phones at this early stage can give patients a true sense of ownership of their problems (Figures 3a and b).

Subsequently, the initial periodontal examination can be done gently with some long-handled interdental brushes, preferably of tapering design and of varying widths, depending on the shapes of the teeth and the various cleaning problems that these pose. These can be introduced gently from both the labial/buccal as well as the palatal aspects of the teeth in order to show patients where their gums bleed and where their biofilm/plaque and associated problems are. Photographs can be taken of the sites of their bleeding and kept as a record by them of those areas of active inflammation (Figures 7 and 8). These can be compared later on to show any improvements following the regular use of their various home cleaning devices.

Once patients can see the stained plaque on their teeth and any associated bleeding or inflammation on their screen it is relatively easy to explain to them that these problems are due to residual bacteria that are not being removed by their daily cleaning routine (Figures 7 and 8).

Many patients may protest initially ('But I clean my teeth xyz times a day and I use a mouthrinse, so how come I still have these problems?'). A helpful answer is that 'you just needed a little bit of help to see where your gum problems really are and now you can see these on your smartphone'.

Most patients will get the 'social and dental grooming' message

quite quickly, not only because of their tacit belief in their smartphones, but also because of their mild narcissism about how they appear on selfies, usually coupled with their desire to be healthy, not to have bad breath, to look good smiling and to appear more attractive in any future photographs.

### Bleeding on brushing versus recording pocket depths (Figures 7 and 8)

Bleeding is a much better indicator of active periodontal inflammation than pocket depths, which are very much dependent on the examiner's skills, training, probe design, the force and angle that the probe is used, as well as the severity of periodontal inflammation then present.<sup>1,2</sup> It is high time that this inconvenient truth is accepted, regardless of how many misleading articles get published using supposedly 'accurate' pocket or attachment loss measurements, sometimes to two decimal places, to describe change in periodontal status. This raises the issue of 'statistical' versus 'clinical' significance. In reality, it is only clinically significant when there has been a change of more than 2 mm, which is why studies have started looking at the proportion of sites that change by more than 2 mm as being a truer measure of clinically significant change.

Audits in various hospital departments have demonstrated a lack of consistency between what the BPE scores apparently are, as recorded in the referral letter, and what is found when the patient is examined later on in that hospital environment. There could be many complicated reasons for those discrepancies. However, it needs to be understood better by more dental professionals (some of whom might have mixed motives) that pocket probing and detailed charting carried out with a sterile surgical instrument may well give some patients the wrong idea that their gum disease is a surgical problem and that therefore it requires a surgical solution rather than a change in their own behaviour.

This is sometimes referred to patients believing in an 'external locus of control', meaning that their belief





**Figure 9.** Bleeding from the gums correlates well with active inflammation. Patients' gingival bleeding can be made readily visible to them by using interspace and interdental brushes of varying sizes and shapes. A long-handled, interdental brush of the right size used from the palatal/lingual as well as the buccal/labial produces enough physical friction to remove the plaque from the interdental col by displacing the two inflamed interdental papillae on either side of that col.

thereafter is that their gum disease needs to be cured, or at least controlled, by regular professional care, eg by three-monthly visits to a hygienist for a quick clean, often without LA, or by the use of some heavily advertised mouthrinse, rather than through a behavioural change on their part

This incorrect impression may be quietly accepted and reinforced in the practice setting, possibly for understandable commercial reasons.<sup>1</sup> However, once that belief goes unchallenged at the first visit, it is very easy for it to become established in patients' minds as being the real truth of the matter. It can then be difficult for them to accept later on, particularly having endured probing and debridement, that it is their lack of effective interdental and gingival crevice cleaning that is the root cause of their ongoing periodontal problems.

### Bleeding as a sign of active periodontal disease

Bleeding represents what is happening now rather than pocket depth measurements which largely represent what has happened in the past. Bleeding is the only thing which clinicians measure that gives a good idea of the current inflammatory status of the patient and periodontal diseases are inflammatory conditions.

This bleeding from patients'

gums can be recorded by photographing the consequences of using interdental brushes, of the correct size and shape with appropriate long handles, being introduced from both the palatal/lingual aspects as well as from the labial/buccal, or by using a single tufted interspace brush vertically at the correct angle (Figure 9).

Many patients choose to buy the cheapest, smallest, short-handled interdental brushes which may be too small to be effective at removing their pathogenic biofilm. Long-handled interdental brushes allow much easier cleaning from the inside of the back teeth. The correct sizes and taper of interdental brushes required for different situations are usually indicated by the handle being a different colour. A photograph of which brush handle colour is recommended by the clinician to be used for which problem area is a handy reminder for patients that can be easily re-accessed from their own photographs held on their phones when they start to clean their teeth in the privacy of their home environment (Figures 7 and 9).

Most sensible patients want to get healthy quickly and, preferably, cheaply. Motivating patients to do this is easier when they can be reminded by glancing at their phones about the correct brushes and techniques that they need to employ if they wish to get periodontally healthy and to stay that way.

### Stills or videos?

Long- and short-handled different diameter or angled brushes can be photographed as stills showing them being used from both the labial and lingual/palatal aspects of their teeth, as appropriate (Figures 7 and 9). Likewise, they can be shown how to use a single tufted or interspace brush vertically.

However, a more powerful tool is to make a short video of them on their smartphones using the recommended holding and illuminating device. Doing this reminds patients later on about the various sizes and shapes that need to be used in the different areas of their mouths. The same personalized short oral hygiene instruction video can also be used to explain the use of the toothbrush and other brushes, such as the single-tufted brush. Often the best way to do this is to use the patients'

smartphones in the Smile Line, which is then used by the dental assistant to carry out the filming while the clinician is left free to demonstrate the recommended cleaning techniques in the mouth and provide a running commentary.

Timed reminders can be programmed on patients' smart phones to remind them about when to carry out the cleaning routine. The real message is that they need to do effective daily physical cleaning for their indefinite future if they want those health and social benefits as well as not losing their teeth. There is evidence<sup>3</sup> that event-based recall (where the health behaviour activity is linked to an established daily habit) is more effective than time-based recall (where the patient attempts the health behaviour activity at the same time every day). Linking the activity to a favourite daily radio or TV programme (which can also be listened to or watched on the smartphone – is there any aspect of modern life that is not associated with smartphones?) can be effective in ensuring adherence to the healthcare advice.

Another useful ploy is to suggest to initially reluctant patients to accept their new-found responsibilities is that they 'only need to clean the teeth that they wish to keep'. That usually provokes the howl 'But I want to keep them all'. That can then be met with a nod, a knowing smile and a gentle comment such as 'I can understand that entirely...and...(pause...)...' well now you know what you have to do to keep even the 'difficult to get at' back teeth by cleaning the inside as well as the outside of those important teeth to keep those as well!

### A holding and lighting device to hold patients' mobile phones to record their images of their periodontal problems

A Smile Line MDP (MDP = Mobile Dental Photography) is just one way to take pictures with the patient's own smartphone camera (Figures 1, 2, 7, 8 and 9). The combination of an adjustable holding device to hold their mobile phones safely, coupled with an illuminating system, was developed by Professor Louis Hardan. It was designed mainly for cosmetic dentistry purposes. The relevant website in Switzerland for further information is [www](http://www).



**Figure 10.** Conventional images of patients' bleeding gums, taken with a ring flash, could be emailed to patients provided they give their consent and the email address is secure to just that person. Images of their bleeding gums might be something that some patients might not wish to share with someone else (GDPR, 2018).



**Figure 12 (a, b)** Images of a patient who continued to believe that using a heavily advertised proprietary mouthrinse twice daily was the correct solution for her extensive periodontitis problems. The implant-retained bridge in the upper arch fell out along with the four implants two weeks after this photograph was taken.



**Figure 11. (a, b)** Gross staining and calculus in a patient who believed that a heavily advertised mouthrinse was the correct solution for his gum disease problems.

**smileline.ch** and the UK distributors are Optident ([www.optident.co.uk](http://www.optident.co.uk)). (Please see disclosure of no conflicts of interest at the end of this article.)

The lights and diffusors can be set according to the manufacturer's instructions in order to improve image quality. Most modern smartphones have more than enough pixels to do the job adequately. The images can be emailed

by the patient to the named clinician in whatever practice they like. Any patient doing so is providing consent for that clinician to hold them as long as these are kept safely and securely and not shared without their permission (GDPR, 2018).

The main purpose of photographing the evidence of their stained biofilm in all its multi-coloured glory (Figures 3a, 3b and 4), as well as showing them their bleeding gums (Figures 7, 8 and 9) following the introduction of the interdental and interspace brushes, is the personalized aspect of the oral hygiene instruction, which is significantly more effective than the use of generic instruction.<sup>4</sup>

The imagery provides a dated record of the oral instruction that was given and is also a medico-legal record in the event of any subsequent claim that they were never told about the gum problems.<sup>3</sup>

Conventional dental photographs with a ring flash could be taken as a record (with patient consent) and these could then be emailed to the

patient's mobile phone, but this is more cumbersome than using the patient's own smartphone and often does not have the same immediate impact (Figure 10).

### Potential problems when using this technology

One downside of undertaking this photographic approach with patients' own smartphones is that there is a significant risk that the photographs might well reveal other dental problems, such as over-contoured, or defective crown and bridge restorations. Furthermore, mismatches in colour, shape and reparative dental materials can also be revealed in any such photographs which, when expanded on the screen, can magnify the apparent size and scale of any such problems. Sensible discretion should be used to help to give the really important information to patients about their present gum problems and it is often appropriate to advise them that the restorations probably now exist because of their previous plaque-induced diseases. It is probably sensible to focus on the current plaque problems rather than being dragged into debating why some normally invisible restorations look as they do, particularly when these restorations may well be very durable and be invisible for most normal social or practical purposes.

### Selfies and individualized brushing techniques: combatting some myths about mouthrinses and periodontal diseases

The saturation bombing advertising campaigns by various mouthrinse manufacturers in new and old media has resulted in many patients now believing that mouthrinses containing various bactericidal chemicals are an easy and allegedly magical solution for their gum problems, rather than requiring repetitive and effective physical removal of their plaque/biofilm.

One consequence of this slick and memorable advertising, which appears repeatedly in all media, is that many patients (consumers) now believe that 'bacteria-killing mouthrinses' are the modern and correct solution for their gum problems. Many have been manipulated

by these cleverly targeted advertisements into believing that these mouthrinses are essential for gum health and are just as effective as using fiddly floss or different sizes of interdental brushes, or using vertical interspace brushing to remove their biofilm physically from their teeth, particularly from the more 'difficult to clean' areas at the back of their mouths.

Perhaps understandably, this widely perceived erroneous opinion is partly based on pharmaceutical companies' massive advertising budgets enabling them to 'position their products' on the covers and on the inside of many peer reviewed dental journals. Pharmaceutical companies also sponsor many national and international professional conferences, in return for which companies expect professional acceptance of their products. However, the hard facts are that mouthrinses have only very limited effects in both gingivitis and periodontitis patients (11th European Workshop, 2015)<sup>5</sup> and the lack of proper evidence for mouthrinses in controlling periodontal diseases<sup>6</sup> does not get challenged hard enough, or often enough, by the dental profession. Furthermore, the need to remove the very visible and tenacious staining caused by chlorhexidine, a common ingredient of many mouthrinses, presents an additional layer of clinical need, especially in smokers. Many smokers are unaware of the proven risks of developing smoking-related periodontitis,<sup>7,8</sup> and many are at risk of believing that, as long as they use a mouthrinse daily, they can continue to smoke with impunity and maintain gum health. It suits many addicted smokers and some 'vapers' to believe that nonsense but that erroneous belief is reinforced by some of the advertisements for mouthrinses. (Figures 11 and 12).

The inconvenient but real truth is that patients need to understand from the outset that gum disease requires an 'internal locus of control', which means that it is their responsibility to remove their plaque physically, properly and consistently. Patients should be encouraged that this can be readily achieved by their own efforts if they just use the correct physical cleaning devices and techniques at the appropriate times.<sup>9</sup> This message can be reinforced readily by the visual reminders of the details of how to do this effectively which have

been captured on their own smart phones.

Recording a BPE or doing six-point pocket depths may often be just dental jargon to many patients. Sadly, neither of these commonly recorded measurements has been scientifically proven to have lasting relevance to the progression of periodontal diseases. Pocket chart measurements are dependent on many variables and are poor at predicting accurately the progression of an individual patient's gum diseases. Unfortunately, most dentists are hopeless at assessing long-term prognosis for teeth that are significantly affected by periodontitis.<sup>8</sup> It is well known that initially deep pockets often get shallower following removal of the gross plaque-induced inflammation by the patients just doing much more effective cleaning by employing the correct devices and techniques. If that is further helped by some professional help, as appropriate, then many heavily compromised teeth may remain stable and not cause problems for very many years, but only if patients' daily home cleaning is effective enough.<sup>9</sup>

### Costs of interdental and other brushes versus costs of mouthrinses

Sadly, to the shame of some multinational pharmaceutical companies and some in the dental profession, a whole industry and belief system has become established around periodontal disease allegedly being capable of being cured by means of various heavily advertised mouthrinses. However, the evidence does not support that view. Richards, writing in *Evidence Based Dentistry* about the usefulness of chlorhexidine mouthrinses, noted that 50 out of 51 studies examined were deemed to be at high risk of bias.<sup>5</sup> He noted that commercial influence was rife and that, while there was some '*reduction in gingivitis in individuals with mild gingival inflammation on average (mean score of 1 on the 0 to 3 GI scale) that this was not considered to be clinically relevant.*'

On the negative side, however, a large increase in extrinsic tooth staining was seen, with chlorhexidine use at four to six weeks, along with multiple other side-effects. The subsequent removal of that recurring chlorhexidine stain nearly always requires repetitive and costly professional

intervention and often includes re-polishing, re-surfacing or sometimes replacement of resin composite restorations (Figure 11a and b). The costs of cleaning off this pharmaceutically-induced, unsightly chlorhexidine stain would be better spent by patients acquiring more effective oral hygiene brushes to remove their plaque physically at the appropriate frequency. That much more honest and caring professional approach benefits most patients much more in the longer term. Sadly, money talks and multiple mixed messages abound in dental healthcare, with many advertisements now making highly questionable claims that often mislead patients and dental professionals. More dental professionals need to challenge more vigorously the scientifically unsubstantiated claims for the efficacy of mouthrinses in curing periodontal problems. Sadly, they don't.

In summary, the message ought to be that, rather than relying on visiting a hygienist or a dentist on a frequent basis for regular reassessments and treatment, patients, possibly now empowered with their own images on their phones, need to take control of their own periodontal condition. If patients more readily accepted those reasonable responsibilities, they would be more likely to become periodontally healthy and keep more of their teeth for much longer.<sup>9</sup>

### State-controlled dental terrorism<sup>10</sup>

If the government paid general dentists and other dental professionals reasonably for their time and expertise in giving patients the right messages consistently, and undertaking other appropriate preventive and effective treatments, then patients and professionals as well as society generally would all benefit greatly.

Effective communication takes time. Unfortunately, the NHS UDA remuneration system, whether by accident or design, effectively discourages an altruistic or sensible approach to helping people with periodontal disease problems in general practice. Partly as a consequence of





**Figure 13.** The areas of the denture adjacent to all abutment teeth have to be disclosed at every visit. Photographing this mature plaque on patients' phones helps them to remember where they need to clean off their gum disease-inducing biofilm.



**Figure 14.** It is the mature pathogenic plaque retained on the denture next to the abutment teeth and not 'excessive non-axial occlusal forces' that causes ongoing periodontal breakdown in partial denture wearers.

various state-imposed contractual and financial anomalies, some hospitals are now overrun with inappropriate referrals.<sup>10</sup> Sadly, it is not uncommon for patients, who eventually get seen in a hospital setting for a specialist opinion, to be completely mystified as to why they have never been given the appropriate, and simple, advice in the past (Figures 4, 7, 9). The present UDA system does not allow clinicians to provide proper periodontal care in general NHS practice and it needs to be changed urgently.<sup>10</sup>

### The removable prosthodontic periodontal interface issues

Dentures need to be disclosed at every visit to demonstrate the reservoirs of mature plaque/biofilm growing happily on the fit surfaces of patients' dentures. Using the Smile Line device can provide

well-lit photographs of stained plaque on their dentures as well as on patients' teeth. These images can be retained on their smartphones and be helpful in getting the correct messages across to patients about their responsibilities for its removal from their prostheses. It is sensible to emphasize to patients that it is the bacteria in their mature biofilm growing on the fit surfaces of their dentures that are responsible for destroying the health of their gums around their remaining very valuable supporting teeth (Figure 13).

Photographs of how to remove this disclosed plaque from the fitting surfaces of their dentures with a single tufted brush acts as a reminder about how those bacteria have to be removed. Many patients who have lost teeth were not 'first division cleaners' of their teeth and gums in the past but many, given the right information about techniques of removal, will make extra attempts to clean their remaining teeth. However, most remain blissfully unaware that any of their periodontal pockets present, particularly those present on the distal of the terminal abutment teeth, will get rapidly recolonized by the pathogens in their mature biofilm on the denture, which are often still present on their denture fit surface when it is re-inserted after a quick scrub around of their natural teeth. It is only a short hop for the pathogenic bugs to jump from the denture back in to re-infect the often hypertrophic inflamed periodontal tissues and the pockets below them.

Many clinicians still cling to outdated concepts about denture design. Much of this centres on issues of support and indirect retention and is based on the 1960s discredited premise that 'non-axial occlusal loading' causes progression of periodontitis around abutment teeth. That is out of date and unscientific. The preparation of near parallel guiding planes to help to stabilize partial dentures is much more important and doing so simplifies design and also reduces the numbers of plaque-retaining minor components on partial dentures.

The biologic truth is that it is the mature biofilm retained on

the fitting surface of the denture that is often the source of periodontal re-infection and is thereby causing patients' progressive periodontitis. It is the quiet but deadly mature biofilm/plaque on the fitting surface of their dentures being allowed to re-infect their inflamed hypertrophic gingival tissues in susceptible patients that causes further loss of attachment and bone support around the abutment teeth and it is **not** due to non-axial occlusal loading<sup>11</sup> (Figure 14).

However, many patients in the UK with partial dentures are subject to 'mushroom management' (meaning that they are kept completely in the dark and given lots of bovine excrement) about the real cause of their denture-related problems. Many unfortunate patients cannot see the biofilm on their dentures because partial dentures do not get disclosed routinely by dental professionals at every visit in order to show patients what they need to do to remove the adherent, well-organized bacterial biofilm on their dentures, which is responsible for their ongoing periodontal and caries problems (Figure 13).

Patients should be encouraged to use blue food dye with a cotton bud to show them where 'their bugs are on their dentures' and to check after their denture cleaning with new blue dye on a new cotton bud that there is no blue-dyed plaque still present (Figures 13 and 14). Sadly, instead of doing this, partial dentures are usually given an occasional quiet overnight soak in some largely useless but heavily advertised denture cleaner.

Graphic pictures of the stained plaque on patients' own phones quickly transfers the onus for effective physical cleaning of their dentures back onto the patient (Figures 13, 14).

A copy of these images can be retained in the records for medico-legal purposes.

### Implant maintenance and specific cleaning problems

Dental implants and implant-retained prostheses need ongoing effective daily cleaning. It is important



**Figure 15.** Disclosed plaque/biofilm on the 'easy to clean' buccal aspects of an implant-retained bridge placed more than 10 years previously for a patient who lost all his upper teeth due to periodontitis and heavy smoking.<sup>6,7</sup>



**Figure 16.** The disclosed under surface of this implant-retained bridge shows abundant pathogenic biofilm present at the implant interfaces and elsewhere. The ridge overlap design made cleaning of the implants underneath the bridge very difficult for the patient.



**Figure 17.** Unscrewing the bridge revealed the gross bleeding and inflammation mainly caused by the patient's inability/failure to remove his/her own plaque from underneath the bridge in spite of being instructed more than 20 times in how to use various devices from different angles.

that the correct information about how to do this is understood clearly by such patients from the outset.

Well-lit photographs held on their phones can help patients to do this

by acting as a record of the special angles and sizes of brushes that are now required to clean the junction between their implants and their gums more effectively. Unfortunately, in many cases, the patients who have lost their teeth were not diligent with oral hygiene in the past, which is why they probably lost their teeth in the first place. Their previously poor dental hygiene is not particularly likely to be improved by curing them of their 'titanium deficiency disease' (Figures 15, 16 and 17).<sup>11</sup>

It may seem obvious to some, but it is probably worth re-iterating, that removal of some or all of the teeth to provide dental implants does not alter a patient's host response to his/her dental biofilm/plaque in the future. That is a point that is rarely, if ever, fully appreciated enough by some clinicians and/or dental implant manufacturers.<sup>11</sup>

Patients who are provided with dental implants need to be informed early on in the planning stages that they now need to be 'top class cleaners' if they want to protect their dental implants' health and their significant investment in having such treatment.<sup>10</sup> Once again, well-lit photographs, or short videos, made on their mobile phones can help these patients by reminding them about how to use various appropriate cleaning implements and devices in their mouth correctly.

Sending a patient a customized text, with their consent, could be considered by some patients to be very good 'added value' in cases treated with implant-retained prostheses. However, given the 2018 General Data Protection Regulations, this would need to be with their written consent.

The elective removal of saveable, if periodontally-compromised teeth, in favour of an often biased and commercially-driven 'place and forget' approach to implants needs to be challenged more robustly by dental professionals. Some implant companies are now driven largely by their commercial interests in their pursuit of market share and profits. Some have inappropriate marketing names like 'Perfect'. Dental implants are neither 'permanent' nor 'perfect'. Both of those words are absolute terms. That means that those words

cannot be qualified by other words such as 'mainly' or 'generally'. Implants are neither permanent nor perfect and should not be described as such, particularly in the case of periodontitis-susceptible patients.<sup>11</sup>

The material long-term risks in removing saveable teeth in order to provide implants in such periodontitis-susceptible patients need to be discussed in detail as part of obtaining valid consent for such treatment, as outlined in the Montgomery (Supreme Court) ruling.<sup>13</sup> A 'Montgomery consent test' means that an adult person, of sound mind, is entitled to decide which, if any, of the available forms of treatment to undergo, and consent must be obtained before treatment interfering with their bodily integrity is undertaken. The doctor (for which one should read 'dentist') is therefore under a duty to take reasonable care to ensure that the patient is aware of any material risks involved in any particular treatment, and of any reasonable alternative or variant treatments. Many patients, if they really knew and understood about the myriad of problems that implant-retained prostheses can pose in the longer term, might well be reluctant to lose their periodontally-compromised teeth in favour of what might well be speculative implant therapy.<sup>9,11</sup> The test of materiality is whether, in the circumstances of the particular case, a reasonable person in the patient's position would be likely to attach significance to the risk, or the doctor (for which read 'dentist') is, or should reasonably be aware, that the particular patient would be likely to attach significance to it.<sup>12</sup>

Acceptance of patients' ongoing responsibilities for daily cleaning needs to be emphasized early on in any discussion about removal of periodontally-compromised teeth in favour of elective implant therapy.<sup>10</sup>

Good records of all discussions need to be kept and these can be supplemented by photographs that show clearly that patients were shown what they needed to do. Patients need both the knowledge and the skills and to be able to demonstrate their ability to maintain effective cleaning around their implants. In the absence of that commitment to cleaning effectively in such cases, dental implants and their prostheses should be





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\* Electromyographic Study of the Dynamic sitting Position Suitable for Dentists M.TH. Verkindere, C Iacomb, and J.PH. Lodter - *Information Dentaire* VOL. 80 No. 12, 26 March 1998 PPS 911–916) See web-site for the original paper and other references.



regarded as probably becoming a liability in the longer term.<sup>12</sup>

## Conclusion

Well-illuminated 'selfies' or short videos taken on patients' own mobile phones using the recommended holder can act as an invaluable method for delivering important information about their periodontal or other dental diseases. Well illuminated images using the device can provide highly graphic and memorable messages about cleaning techniques that are easy for them to view at any appropriate time. They can act as a strong motivational tool to help patients to gain periodontal health by them seeing where their real problems are. They help patients to remember what and when they need to do it in order to achieve this highly desirable healthy outcome for themselves.

Furthermore, they can act as a medico-legal record to show that patients were indeed shown about their periodontal problems and how to do their cleaning effectively and appropriately to solve their problems.

## Declaration of conflicts of Interest

None: neither of the authors has any commercial, or other conflicts of interest, with regard to the device, Smile Line MDP.

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