Scientists are trying to open a new front in the battle against gum disease, the leading cause of tooth loss in adults and sometimes termed the most serious oral health problem of the 21st century. They described another treatment approach for the condition in a report here today at the 244th National Meeting & Exposition of the American Chemical Society, the world’s largest scientific society.

“Our technology uses controlled-release capsules filled with a protein that would be injected in the pockets between the gums and the teeth,” said Steven Little, Ph.D., who reported on the research. “That’s ground-zero for periodontal disease ‘gum disease’ the place where bacteria breed and inflammation occurs. The capsules dissolve over time, releasing a protein that acts as a homing beacon. It guides immune cells to the diseased area, reducing inflammation, creating an environment that fights the disease process and even could create conditions favorable for gum tissue to regrow.”

Little and colleagues, who are with the University of Pittsburgh, have evidence from laboratory experiments with mice stand-ins for humans in early research of this kind that cannot be done with actual patients that the approach does foster healing and regrowth of gum tissue damaged by periodontal disease.

A bacterial infection causes periodontal disease. It first appears as mild tenderness and bleeding of the gums. It leads to inflammation and, if left untreated, can damage the gums so that they recede and lose their attachment to the teeth. It may progress even further and damage bone and other tissues that hold teeth firmly in place. Surprisingly, gum disease has a number of deleterious effects outside the mouth, with some studies linking inflammation in the gums to an increased risk of heart disease, stroke and preterm delivery in pregnant women.

Treatment includes scal...
Perio Tribune

DENTAL TRIBUNE

United Kingdom Edition

September 10-16, 2012

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ing, root planing and other procedures to remove the plaque and bacteria that have accumulated in pockets between the teeth and gums. Dentists may combine this with antibiotics to fight the bacteria involved in gum disease.

Many scientists are seeking alternative treatments that kill the bacteria. Little’s group is taking an entirely different approach. They are targeting the disease, inflammation is what keeps it going and causes progressive damage,” Little explained.

To reduce inflammation at the gums, Little and colleagues designed injectable controlled-release capsules containing a protein encased inside a plastic-like polymer material. The polymer is already used in medicine in dissolvable sutures. After the capsules are injected, the polymer slowly breaks down, releasing the protein encapsulated inside. The protein, termed a chemokine, is already produced by the body’s existing cells in order to summon specialised white blood cells to a specific site. Scientists previously tried to keep these cells away from the gums so as to block inflammation from occurring in the first place.

“It seems counterintuitive to lure in a lymphocyte, which is traditionally thought of as an inflammatory cell, if there’s inflammation,” Little pointed out. “But remember that a certain level of natural inflammation is required to fight off an infection. Inflammation is inherently a good thing, but too much of it is a bad thing. That’s why we aim to restore the immune balance, or homeostasis.”

Little’s team injected the capsules into mice and discovered evidence that disease symptoms are dramatically reduced and that proteins and other substances involved in regrowth of gum tissue had appeared. Little said that this finding offers encouragement that the treatment could not only rebalance the immune system, but also prompt growth of lost gum and bone tissue in the mouth.

The researchers acknowledged funding from the Arnold and Mabel Beckman Foundation, the Wallace H Coulter Foundation and the National Institute of Dental and Craniofacial Regeneration of the NIH (1R01DE21058-01).

This research was presented at a meeting of the American Chemical Society.

Source: American Chemical Society http://portal.acs.org/portal/acscorg/content

Improving periodontal health in style

A number of key decision makers and specialists in periodontology, dental public health & restorative dentistry came together recently to review the latest additions to the wealth of clinical evidence on Triclosan & Copolymer at an event held within the superb English Heritage site of Wellington Arch in central London.

Dr Fotinos Panagakos, Colgate Director of Clinical Research, orals health2 and shared some insight into the difference between therapeutic and cosmetic claims made by toothpaste manufacturers, depending on whether the products had medicinal licence status.

For further information on New Colgate® Total² Pro Gum Health toothpaste and details of its medicinal licence status, visit www.colgateprofessional.co.uk

Global Oral Care partnership

Colgate is pleased to announce a global partnership with OMRON, a worldwide leader in innovative sensing and control technology for the manufacture of medical and home healthcare products.

OMRON, based in Japan, are a leading innovator in their field, and produced the first Japanese components for X-ray machines in 1955. OMRON has continued to develop ground breaking home healthcare products, including innovative blood pressure monitors during the 1970s and developed the first digital thermometer in 1985.

Colgate is excited to form a strategic relationship with OMRON that combines OMRON technology, with the oral care expertise of Colgate, to provide the next generation of electric toothbrushes. Colgate will launch this new and innovative range of products at the British Dental Trade Association Dental Showcase 4-6th October, ExCeL London.

To have a chance of being among the first dental professionals to try this breakthrough technology, simply register your details at www.colgateprofessional.co.uk. Full terms and conditions are available on the website.

Inflammation is inherently a good thing, but too much of it is a bad thing. That’s why we aim to restore the immune balance, or homeostasis’

Perio prevalence in US reported in study


Lead author Paul Eke used information from a sample of 3,742 adults 50 years and older with one or more natural teeth of the civilian non-institutionalized population. Attachment loss and probing depth were measured at six sites per tooth on all teeth (except the third molars). The study is important because it is the first national probability sample that has employed a full-mouth periodontal examination protocol versus previous partial mouth examinations.

Of the sample presented, 47.2 per cent, representing 64.7 million adults, had periodontitis distributed as 8.7 per cent, 30.0 per cent and 8.5 per cent with mild, moderate and severe periodontitis respectively. For adults 65 years and older, 8.4 per cent had either moderate or severe periodontitis. These estimates are far higher than previous national estimates.

Periodontitis was highest in males, Mexican Americans, adults with less than high school education, adults below 100% Federal Poverty Levels and current smokers. This survey has provided direct evidence for a high burden of periodontitis in the adult U.S. population, especially among adults 65 and older.

This information implies that despite America having almost twice the number of dentists per person compared to other countries, still more needs to be done to increase oral care and dental education, partially within the less affluent areas of the country.

Dr Anousheh Alavi, Scientific Affairs Manager, Colgate UK & Ireland, opened the proceedings. The study is implied to consensus of experts, in line with the ranking of evidence in the Department of Health publication: Delivering Better Oral Health and shared some insight into the difference between therapeutic and cosmetic claims made by toothpaste manufacturers, depending on whether the products had medicinal licence status.

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New Colgate® Total² Pro Gum Health toothpaste is medically licensed to ‘improve gingival health and reduce the progression of periodontitis’. It contains clinically proven Triclosan & Copolymer Technology to improve gingival health for everyday use, as part of treatment and maintenance of periodontal health.

This unique partnership combines OMRON technology, with the oral care expertise of Colgate, to provide the next generation of electric toothbrushes. Colgate will launch this new and innovative range of products at the British Dental Trade Association Dental Showcase 4-6th October, ExCeL London.

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Protocol building for effective periodontal case management in general practice

Mhari Coxon discusses why having a protocol is vital

One way to ensure that the advice, assessment, diagnosis and treatment path remains at a consistently high standard in practice is to build a protocol which the whole practice will work to. This also makes induction training for new staff members robust and in keeping with CQC guidelines. The protocol is a map for anyone to refer to which will add reassurance and weight to their own conclusions. The secret to success within general practice is to be consistent in your delivery. Protocols really help this to happen.

What should go in your protocol?
Well, if I am honest, as much or as little as you feel appropriate. If you have several dental professionals working on periodontal cases in your practice, for example three part time hygienists and a specialist periodontist who comes in once a month, then you would need a detailed protocol as they will undoubtedly have different opinions on what is right and not and what should be advised or used and not. The initial mapping of the protocol can take longer the more dental professionals are involved but is never the less important within the practice and to incorporate caries and tooth surface loss but this example is purely assessing for risk in relation to periodontal treatment.

Tobacco Use: This is THE most significant risk factor for gum disease
Please circle if you now or have ever used

<table>
<thead>
<tr>
<th>Cigarettes</th>
<th>Cigars</th>
<th>Pipe</th>
<th>Chewing Tobacco/Paan</th>
<th>Snuff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount Per day</td>
<td>Used for How Many Years</td>
<td>If you quit, when did you quit?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Heart Attack/Stroke: Untreated gum disease can increase your risk of heart attack or stroke
Do you have any other risk factors for heart disease or stroke? (please circle)
None

Family history of heart disease
Tobacco Use
High Cholesterol
High Blood Pressure

Medications: A side effect of some medications causes changes in gums
Have you ever taken the following medications?

None
Anti-Epileptic Medications
Calcium Channel Inhibitors
Cyclosporin

Genetic: The tendency for gum disease to develop can be inherited
Has anyone on your side of the family had gum problems (eg mother, father or siblings)?
Yes
No

Diabetes: Diabetics are more prone to gum disease. If left untreated, gum disease makes it harder to control their blood sugar. When gum disease is eliminated, diabetics may improve their blood sugar control and make diabetic complications less likely.

Any family history of diabetes?
Yes
No

Have you had any of these warning signs of diabetes?

None
Frequent urination
Excessive thirst
Excessive hunger

Weakness and fatigue
Slow healing of cuts
Unexplained weight loss

Rheumatoid Arthritis: The causes of gum disease and RA may be related. One doesn’t cause the other, but when one is present the other is more likely to be going on. If your gums are inflamed you may be at increased risk for developing RA.

Have you ever been diagnosed with Rheumatoid Arthritis?
Yes
No

If you have rheumatoid arthritis, emerging research suggests that eliminating any gum disease and then keeping it at bay can lessen the crippling effects of arthritis

Special Concerns for Females:

Pregnancy: Tell us if you are planning to become pregnant. Gum disease can make it up to eight times more likely that you will have a pre-term low birth weight baby. You can greatly reduce the likelihood of having an adverse pregnancy outcome by finding out if you have any gum disease and then doing whatever is necessary to eliminate it before you get pregnant. It is also important to make sure your gums are inflammation free while you are pregnant.

Osteoporosis:
Do you have osteoporosis?
Yes
No

The following are risk factors for osteoporosis:
Post-menopausal
Family history of osteoporosis
Early menopause
Rheumatoid Arthritis
Inadequate exercise
Smoking

Have you any risk factors for osteoporosis?
Yes
No

Have you ever been tested?
Yes
No
Please note that the wording of these questions is to ensure they are easy to understand for the patient and easy to answer. The risk assessment questionnaire is useful in more than one way. It is extremely useful for gathering information to aid diagnosis and categorisation of a patient. It is also a subtle tool for moving the patient from pre-contemplation to contemplation regarding their gum health. This, combined with a little open question session, can create a non-confrontational opening to discussion and advice and education sessions.

BPE guidelines and a guide to care – see www.bsperio.org.uk for full details.

Careful assessment of the periodontal tissues is an essential component of patient management. The BPE is a simple and rapid screening tool that is used to indicate the level of examination needed and to provide basic guidance on treatment need. Please note; the BPE does not provide a diagnosis.

How to record the BPE

1. The dentition is divided into six sextants: upper right (17 to 14), upper anterior (15 to 25), upper left (24 to 27), lower right (47 to 44), lower anterior (43 to 55), lower left (54 to 57)

2. All teeth in each sextant are examined (with the exception of 3rd molars).

3. For a sextant to qualify for recording, it must contain at least two teeth. (If only one tooth is present in a sextant, the score for that tooth is included in the recording for the adjoining sextant).

4. A WHO BPE probe is used (World Health Organisation probe). This has a “ball end” 0.5 mm in diameter, and a black band from 3.5 to 5.5 mm. Light probing force should be used (20-25 grams). – you can calibrate your probing using an electric scale to measure 10 probe movements and take the mean number. You can also invest in a set of pressure sensitive probes if you want ot be gold standard.

Probing

The probe should be “walked around” the sulcus/pockets in each sextant, and the highest score recorded. As soon as a code 4 is identified in a sextant, the clinician may then move directly on to the next sextant, though it is better to continue to examine all sites in the sextant. This will help to gain a fuller understanding of the periodontal condition, and will make sure that furcation involvements are not missed. If a code 4 is not detected, then all sites should be examined to ensure that the highest score in the sextant is recorded before moving on to the next sextant.

BPE Scores

0 No pockets >5.5 mm, no calculus/overhangs, no bleeding after probing (black band completely visible)

1 No pockets >5.5 mm, no calculus/overhangs, but bleeding after probing (black band completely visible)

2 No pockets >5.5 mm, but supra- or subgingival calculus/overhangs (black band completely visible)

3 Probing depth 3.5-5.5 mm (black band partially visible, indicating pocket of 4-5 mm)

4 Probing depth >5.5 mm (black band entirely within the pocket, indicating pocket of 6 mm or more)

5 Furcation involvement

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2. Implant strength & fatigue testing done in accordance with ISO standard 14801.

3. Initial clinical efficacy of 3-mm implants immediately placed into function in conditions of limited spacing. Reddy MS, O’Neal SJ, Haigh S, Aponte-Wesson R, Geurs NC.

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Laser-Lok 3.0 is the first 3mm implant that incorporates Laser-Lok technology to create a biologic seal and maintain crestal bone.

• Two-piece 3mm design offers restorative flexibility in narrow spaces
• Implant design is more than 20% stronger than competitor implant
• 3mm threadform shown to be effective when immediately loaded
• Laser-Lok microchannels create a physical connective tissue attachment (unlike Sharpey fibers)

Treat small spaces with confidence

Introducing the Laser-Lok® 3.0 implant
Periodontal Disease

How do you measure success?

Dentomycin offers:

- **42% reduction in pocket depth after 12 weeks**
- **broader spectrum of antibacterial action** with greater activity than metronidazole or tetracycline
- **conditioning of the root surface** and enhanced connective tissue attachment
- **improved healing** through inhibition of degradative collagenases
- **effective treatment of chronic periodontitis which has been associated with cardiovascular diseases**

Information about adverse event reporting can be found at www.yellowcard.gov.uk. Adverse events should also be reported to Blackwell Supplies, Macadore House, Gillingham, Kent ME8 0SB, or by telephone: 01634 877525.
Insights into the latest therapy options for periodontitis

A look at Europerio7 in Vienna

A s part of this year's Europerio in Vienna, Heraeus held two symposia on the latest developments in the treatment of periodontitis. The question investigated by the first session on Friday morning was how local antibiotics can assist in the treatment of periodontitis. Following a brief introduction from Professor Niklaus P. Lang from the University of Hong Kong, China, Professor Maurizio S. Tonetti, Executive Director of the European Research Group on Periodontology (ERGOPerio), Italy, opened the first Heraeus symposium with his presentation on current understanding of periodontitis and how it changes treatment. He began by immediately emphasising that periodontitis has become a serious health problem in Europe.

In addition to the role played by biofilm in triggering development, individual susceptibility to periodontal disease is also an increasingly important factor. This is influenced by genetic predisposition and environmental risk factors, and determines the intensity and clinical presentation of the periodontal inflammatory process.

Periodontitis is also proven to have various effects on the body as a whole. In addition to providing systematic periodontal therapy with regular follow-up for the rest of the patient's life, it is therefore also important to limit additional risk factors. With professional preventive measures geared towards the patient's individual symptoms, further progression of the condition can be prevented in the long-term.

Professor Tonetti concluded with an outlook on possible future therapies. In a dog (beagle) model of replacement therapy, "friendly" bacteria such as streptococcus sanguinis, streptococcus salivarius and streptococcus mitis appear to have a positive impact on inflammatory response when applied sub-gingivally in addition to scaling & root planing (SRP). This is demonstrated in X-ray images by increased bone density and bone level change of tooth loss. This is also the level at which the composition of biofilm and its pathogenicity changes. The local administration of adjunctive antibiotics requires the application of a significantly higher concentration of active ingredients in order to kill the periodontal pathogenic bacteria. In addition, the delivered substance must remain at the active site for a sufficient length of time in order to ensure continued release of the active ingredient.

A recently completed study by the ERGOPerio group (Tonetti et al., 2012) investigated the therapeutic effect of once-off, topical, adjunctive administration of a slow-release doxycycline gel (SRD) in patients with persistent/recurrent periodontitis during supportive periodontal therapy (SPT). Following supra-gingival debridement and sub-gingival treatment using ultrasonic/sonic instrumentation, the SRD was applied in all the residual pockets ≥ 4 mm in the test group. The result of this study supports the concept of additional local antibiotic administration, particularly SRD. In the treatment of persistent/recurrent periodontitis during SPT, this has been shown to have a positive therapeutic effect on inflammatory response as well as in the case of deep pockets (≥ 5 mm). Local antibiotic also seems to be the most effective approach for treating peri-implantitis due to the high concentration of active ingredients. The micro-biological flora is for the most part comparable with periodontitis, although peri-implant lesions may also be affected by staphylococcus aureus (typical pyogenic organism). The discharge of pus when probing a pocket is a clinical indication of infection in the diagnosis of peri-implantitis. The greatest challenge here is the removal of biofilm, a procedure that is considerably more difficult in the case of implant surfaces than in the case of natural dentition. Currently there is no standard, evidence-based approach to therapy: local antibiotics may provide an answer for the future, however, this must first be borne out by a study. Nevertheless, Professor Lang summarises as follows: “Nothing excuses the patient from cleaning his teeth every day”.

Dr. Waleed S.W. Shalaby, Chief Science Officer at Poly-Med Inc., USA, continued in the same vein as Professor Lang, and presented the latest biomaterials for oral and periodontal applications. He provided detailed information on the critical aspect of the slow release of active ingredients in local antibiotics.

According to Dr. Shalaby, “The development of Liganos Slow Release for non-surgical therapy of periodontitis is a good example of functional technological innovation”. Its main feature is its biodegradable carrier substance comprised of hydrophobic and hydrophilic parts, which ensure that the initially fluid consistency enables penetration into the deep areas of the periodontal pocket that are difficult to reach. Liquid environments increase the viscosity, creating a gel consistency that ensures that the carrier substance remains at the active site. This ef-
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Atlantis™ crown abutment is an efficient, effective and aesthetic alternative to traditional cast abutments for single-tooth, screw-retained restorations. Like Atlantis™ patient-specific CAD/CAM abutments for cement-retained restorations, the Atlantis crown abutment is uniquely designed from the final tooth shape for more natural aesthetic results and available for all major implant systems. It is also precision-milled from a solid blank of biocompatible zirconia, which eliminates the need to cast with precious metals.

What’s more, because porcelain is applied directly to the Atlantis crown abutment, it can be easily retrieved, if needed, and the time and cost of preparing a separate coping is recaptured. Atlantis crown abutment is available in five shades, including a new translucent zirconia in white. It can be placed in all positions in the mouth and is covered by a comprehensive warranty.

For more on the benefits of Atlantis™ screw- and cement-retained solutions, visit www.astratechdental.co.uk.

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sis can be performed, helping to prevent insufficient or excessive treatment. Professor Ratka-Krüger continued with a description of the timeframe for a follow-up check-up, providing detailed information on the individual steps and what they entail. She referred back to the positive effect discussed in the first Heraeus symposium, specifically that of additional topical administration of SRD gel in the case of previously untreated cases of periodontitis (Eickholz et al., 2002), and once again emphasised the advantages of local antibiotics: reliable, simple and fast application. The additional benefits of this approach combined with SRP during SPT are also scientifically proven (Tonetti et al., 2012). In this regard, she also referred to a study (Dannewitz et al., 2009) in which the effect of topical SRD administration in addition to SRP during SPT was investigated in teeth with furcation defects. Once again, improvement was observed at furcation sites compared with SRP alone. In her conclusion, Professor Ratka-Krüger described supportive periodontal therapy as the key to long-term therapy success. Regular participation in risk-based follow-up allows recurrences to be recognised and treated at an early stage, thus preventing tooth loss. Local antibiotics can boost the effect of mechanical therapy, contributing to the success of treatment.

In the second presentation “Telomere Length, Oxidative Stress and Chronic Periodontal Inflammation: Implications for Supportive Therapy”, Juliette Reeves, Clinical Director at Perio-Nutrition, Great Britain, looked at previously little-known links with periodontitis. Telomeres are regions at each end of a chromosome that shorten each time cells divide. This process is accelerated by oxidative stress. The length of telomeres is related to aging, chronic infection, oxidative stress and systemic illness (Zglinicki et al., 2005). Over the last ten years, the effects of periodontitis on general health have been clearly established. Masi et al. (2011) found that shorter telomeres are linked to periodontitis and that their size correlates with oxidative stress and the gravity of the condition. Gilley et al. (2008) proved that telomere degradation, the extent of chronic infection and oxidative stress can be reduced through changes in lifestyle (smoking, nutrition, obesity, stress). In her presentation, Ms. Reeves once again demonstrated the evidence-based links between living a healthier life and periodontal and general health, and defined the control of inflammatory response as a primary goal of treatment.
Gumsaver® unveils a brand new oral health system designed to treat and prevent gum disease

The gumsaver® team have just returned from presenting this data at the International Association for Dental Research (IADR) General Session in Brazil and received wide acclaim from their global colleagues.

Invented by Leamington-Spa based dentist Dr Hani Mustafa, Gumsaver® has been designed to tackle one of the UK’s most significant public health challenges today.

Inevitability “As a practicing dentist for 14 years, I have always been frustrated by the inevitability of tooth loss amongst patients with periodontal disease. Since 2006, I have been advocating the use of a narrow headed inter-dental brush and sub-gingival oral hygiene techniques, as taught by Philip Ower and the late Graham Smart. I have designed Gumsaver® to enable the dentist, therapist and hygienist and more importantly the patient, to clean below the gum-line, thereby removing sub-gingival pathogenic bacteria from the root surface.”

The gumsaver® system includes a soft bristled tool specifically designed to remove the bacteria from beneath the gum line and between the teeth, and a simple three step cleaning technique.

We have designed Gumsaver® to make the task of looking after gums and teeth simple for dentists, therapists, hygienists and the patient:

• The ergonomic design of the brush along with the simple 3 step technique means patients can be taught how to treat and prevent gum disease at home.
• The bristle heads are angled towards each other and are spaced apart, providing a small clearance in which the inter-dental spaces are lined up during use.
• An up and down motion will guide a head under the gum-line and into the pocket to remove bacteria rooted deep inside the inter-dental space. Just repeat in between every tooth, inside and out.
• The unique angle of the heads make it easy for the patient to use and the soft bristles will reduce any discomfort, thereby improving patient compliance.

Audit In an audit of 95 patients with pocket depths of 3.5 – 10mm (BPE 3 or 4), Warwick Dentistry found that 98 per cent of subjects using the Gumsaver® system experienced a significant improvement. After just six months of using the Gumsaver® system, a staggering 65 per cent of subjects presented BPE scores of 0. In other words, their gum disease had been completely eradicated. The Gumsaver
A historical perspective of the development of the Laser-Assisted New Attachment Procedure is presented in this article. The simplicity of the protocol is discussed, as well as its nuances. The concept of the Laser-Assisted New Attachment Procedure (LANAP) was born back in 1989 with Drs Robert Gregg II and Del McCarthy. As with most general dentists battling with the day-to-day realities of periodontal disease, they were looking for an answer on how to better care for their patients. The reality at the time was that periodontal disease was difficult to treat and maintain. It was primarily based on older concepts of wound debridement and amputation. Once treated, relapse was common. We know periodontal disease is a multifactorial disease process and patient behavioural routines can play a significant role. It is a wonder that the conventional treatments worked as well as they did. Even when they did work, there often were significant secondary repercussions clinically as well as psychologically. Clinically, many of these traditionally treated cases were difficult to restore whenever dental prosthetic treatment was needed and patients were often left with the compromised aesthetic result of a long tooth appearance. Post-surgically, there was significant root surface exposure and with patients’ increased life span and the incidence of dry mouth, root caries can become a very difficult entity to control.

More problematic, is that psychologically many of these patients felt that the discomfort from the procedure and/or the residual tooth sensitivity after treatment was so great that they would not complete remaining areas that needed treatment or declined retreatment when they relapsed. Further complicating matters, the patients would recount their experiences to friends and family, making case acceptance for periodontal treatment often a challenge. During this same time, Drs Gregg and McCarthy were involved in the early use of Nd:YAG lasers in dentistry.

Confronted with patients not wishing to lose teeth and declining traditional surgery or extraction, they developed the LANAP protocol, which eventually led to its US FDA clearance in 2004. In concept, the LANAP protocol is rather simplistic. The ultimate goal is to set up the periodontal environment to promote self-regeneration of the lost attachment and osseous structure that result from LANAP – Laser-Assisted New Attachment Procedure. Reinforced when new attachment was found on all the LANAP-treated teeth in the initial histology studies done by Dr Ray Yukna. LANAP is also a very safe protocol. The use of the Nd:YAG laser has often been of concern by some owing to possible damage to root surfaces and the tissue attachment but, with a basic understanding of laser physics, laser-tissue interaction parameters were developed that enabled the use of an Nd:YAG in a very safe and effective manner. LANAP is also standardised. That is, before a doctor can obtain his laser he goes through three days of training: one day of laser physics and laser-tissue interaction and then two days of hands-on training with patients. This is then followed up by two more separate days of treating patients to refine techniques and add other treatment modalities utilising the Nd:YAG. Because of the simplicity, predictability and standardisation of LANAP, it has become a very safe and effective way to treat periodontal disease. The simplicity of the LANAP protocol can be seen in Table I.

**LANAP protocol**

**Step A**

Patients undergo a full dental examination and treatment plan—as with all dentistry. If they have an appropriate diagnosis of Type III or greater periodontal disease, all treatment options are presented to the patient. The initial step of the LANAP protocol, after anaesthesia has been administered, is bone sounding around each tooth. The objective is to determine areas of osseous defects that cannot be seen radiographically.

**Step B**

This is the first time the laser is used. The objective is to determine areas of osseous defects that cannot be seen radiographically.

**LANAP - Laser-assisted new attachment procedure**

Dr David Kimmel discusses the LANAP protocol

Patients undergo a full dental examination and treatment plan—as with all dentistry. If they have an appropriate diagnosis of Type III or greater periodontal disease, all treatment options are presented to the patient. The initial step of the LANAP protocol, after anaesthesia has been administered, is bone sounding around each tooth. The objective is to determine areas of osseous defects that cannot be seen radiographically.

**Step B**

This is the first time the laser is used. The objective of this step is to remove only diseased epithelium, to affect selectively bacte-
ria associated with periodontal disease, to affect the calculus present, and to affect thermo-labile toxins. The bacteria that are associated with periodontal diseases are pigmented and are found in the sulcus, within the root surface and within the epithelial cells. One of the reasons for the predictability of this step is in the selection of a fre-erunning pulsed Nd:YAG laser with a wavelength of 1,064 nm and pulsed in a range of seven different microseconds. The shorter 1,064 nm wavelength was selected for its affinity for melanin or dark pigmentation, unlike the longer wavelengths that are highly absorbed in water and would have a shallow depth of penetration. This ability to increase the depth of penetration of the laser energy with minimal collateral damage is the reason that the diseased epithelium can be selectively removed without damage to the underlying tissue, leaving intact rete pegs. The diode lasers are also known for this selective absorption in pigmented tissues, but the freerunning, pulsed Nd:YAG lasers differ in their ability to operate at very high peak powers in very short timeframes, which allows the Nd:YAG to have the greater depth of penetration and the lack of collateral damage.

Step C
This step in the LANAP protocol is straightforward; it is just a matter of using the piezo-scalers to remove the calculus present on the root surfaces. The removal of calculus is believed to be easier after the interaction of the laser energy with the calculus. The first interaction of the laser results in the initial formation of a mini-flap, thereby further assisting in the removal of calculus because of increased visibility and access to the calculus.

Step D
The next step again utilises the laser. This time the parameters are varied to enhance the ability to form a fibrin clot to close the mini-flap and to disinfect the site again. The formation of the stable fibrin clot is significant, as it is stable for approximately 14 days. The role of the fibrin clot is to keep the

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sulcus sealed against bacterial infiltration and to prevent the growth of epithelium down into the sulcus. Oral lasers lengths not only lack the ability to form this stable fibrin clot, but also require repeated treatments to prevent epithelial growth down into the sulcus. The ability to select the laser tissue interaction specifically is unique to the PerioLase MVP-7 (Millenium Dental Technologies). Through the use of specific fibre sizes, energy, repetition rates and standardisation of the energy at the fibre tip, this protocol can be followed in a predictable and reproducible manner. The high standard of training that each LANAP doctor receives also contributes to the predictability of this protocol and to its safety. Patients often present with different tissue types along with different degrees of disease. One of the purposes of the hands-on training is learning to recognise these differences and how to change the laser parameters accordingly so that the desired laser-tissue interactions are achieved.

Step E
The fifth step in LANAP is the compression of the fibrin clot to enhance the healing process. Because laser wounds heal by secondary intention, closer approximation enhances the healing time.

Step F
Following the compression and stabilisation of the clot, the last step of LANAP is refining the occlusion. Occlusion has been considered a greater cofactor in the progression of periodontal disease than smoking. In order to minimise this role, extensive adjustments of the dentition. The patients are then followed for nine to 12 months with routine supra-gingival cleanings and occlusal refinements. No sub-gingival restorations are achieved. The extent of the osseous defect is apparent. Minimal to no recession is shown in the preoperative clinical photograph in Figure 7 and the post-operative in Figure 8.

LANAP case 1
The patient in this case was a 40-year-old female patient with a history of lupus, rheumatoid arthritis and Sjogren’s syndrome. She was also a smoker. There was generalised deep pocketing as seen in her periodontal charting. The extent of the osseous defect is shown on the lingual view of the right quadrant postoperative CBT scan. The initial post-LANAP evaluation was done at 15 months. Post-operative probing is shown in Figure 5. The CBT from the lingual view of the right quadrant at 15 months postoperatively is shown in Figure 6. The change in the osseous defects is apparent. Minimal to no recession is shown in the preoperative clinical photograph in Figure 7 and the post-operative in Figure 8.

LANAP case 2
The patient in this case was a 59-year-old male patient, with Type 1 diabetes and a smoker. His periodontal pocketing was 7 mm on the mesial second premolar. The preoperative X-ray is shown in Figure 9 and the 56-month post-LANAP X-ray in Figure 10. The 7 mm pocket had been stable and maintained at 5 mm for the last 36 months. The LANAP protocol will be 21 years old this year. It is coming of age. It has stood the test of time. There are over 1,000 trained clinicians applying LANAP. They have all been standardised. The uniqueness of the protocol is that whether the doctor is new to LANAP or a veteran “LANAP’er”, his results are similar. During its early stages, early adopters accepted LANAP with anecdotal evidence alone, which was reinforced by the individual successes seen clinically. It was further validated by Dr Ray Yukna’s histological studies in 2005. As the LANAP...