Petition calls for NHS-funded occupational health services

An e-petition has been launched to reinstate occupational health facilities for dental staff

The removal of occupational health facilities means that dental staff are not entitled to vaccinations that would protect them from blood borne viruses should a needlestick injury occur.

Text messages could help smokers quit

A text messaging program could help smokers quit, researchers at the Milken Institute School of Public Health have found. The study, published in the American Journal of Preventive Medicine, had participants enrol in Text2Quit, a mobile-based smoking cessation program which offers personalised advice on kicking the habit based on a user’s quit date. The text messages also allow participants to ask for more help or to reset a quit date if they need more time. If users feel a craving, they can text ‘CRAVE’ to receive a tip or game that might distract them.

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Australian dental cuts a ‘disaster’

Dental spending will see a huge cut in Australia’s next federal budget.

According to ABC News, the Australian government has cut two dental programs and put a $590 million program for the states to shorten adult waiting lists on hold. Newell Johnson, Griffith University Professor of Dental Research, said this was a “disaster” for dental health and that the waiting lists could double or treble, depending on the delay.

More than $200 million for new dental clinics in regional areas and nursing homes has also been scrapped.

However, Federal Health Minister Peter Dutton says the dental budget is actually going up, with the government intending to spend $2.7 billion on dental services over the next four years. Most of this will go to the Child Dental Benefits Schedule, which provides basic dental work for children aged two to 17.

The government expects to save $80 billion from cutbacks to the health and education sectors over the next ten years.

BDA: GDC Chair ‘oversimplifies’ dental treatment

The British Dental Association’s chief executive Peter Ward has said Bill Moyes’ comparison of patients’ dental treatment with shopping in Lidl or Waitrose is a ‘facile oversimplification’.

In a recent article in the Times, GDC Chair Bill Moyes was quoted as saying that he would be pleased if patient pressure produced in dentistry the ‘lidl to Waitrose’ model with all the small retailers in the middle.

Peter Ward commented: “Good dentistry is actually about relationships, trust and confidence between dentists and their patients. Seeking to oversimplify this by comparing patient care to the price of baked beans and sun-dried tomatoes completely misses the point.

“That this view is apparently held by the chair of the body charged with protecting patients makes frightening reading. Patient care, clinical quality and safety are really important. Waitrose and Lidl don’t know about those things.”

Patients with kidney disease at lower risk of caries

Patients with chronic kidney disease (CKD) can often have several oral and dental concerns, but are not at a higher risk for dental caries, a new study has found.

With the number of patients with CKD seeking dental care increasing, this study set out to compare specific markers of oral health status of patients with CKD of different stages.

A group of patients with CKD and a control group of participants who were completely disease-free took part in the five-month study. Each patient was examined for dental caries, oral hygiene and periodontal status.

The study found that patients with CKD of various stages had significantly fewer decayed teeth than the control group. This supports previous findings that patients with CKD may be at lower risk for dental caries, due to the protective effects of elevated salivary urea on tooth enamel.

The mean gingival index score for patients with CKD was more than double the score of the control group, and gingival and oral hygiene status declined with advancing stages of CKD. The prevalence of periodontal pockets was higher in patients with CKD.

Could lasers mean the end of root canals?

Laser treatment is a viable option for tooth decay due to the researchers’ findings.

Lasers could regenerate damaged teeth and be used to prevent root canal treatments, researchers from Harvard University say.

The researchers found that lasers were used to cause pain to 26 blindfolded volunteers without any touch. With the exception of hairless skin on the hands, spatial acuity improves towards the centre of the body whereas the acuity for touch is best at the extremities, the researchers found.

Lead author Dr Flavia Mancini said: “If you try to test pain with a physical object like a needle, you are also stimulating touch. This clouds the results, like taking an eye test wearing sunglasses. Using a specially-calibrated laser, we stimulate only the pain nerves for touch is best at the extremities, the researchers found.

Senior author Dr Giandomenico Iannetti said: “Touch and pain are mediated by different sensory systems. While tactile acuity has been well studied, pain acuity has been largely ignored, beyond the common textbook assertion that pain has lower acuity than touch.

“We found the opposite: acuity for touch and pain are actually very similar. The main difference is in their gradients across the body. For example, pain acuity across the arm is much higher at the shoulder than at the wrist, whereas the opposite is true for touch.”

Ability to identify pain varies across the body

There is a difference in our ability to identify pain – spatial acuity – varies across the body, with the forehead and fingertips being most sensitive, a new study from University College London has found.

For the study, published in the journal Annals of Neurology,
Coffee could be beneficial to dental health

Strong black coffee has the potential to break down bacterial biofilms, new research has found.

The research, published in the journal SIAM's Letters in Applied Microbiology, shows that an extract of Coffea canephora – a coffee variety mostly grown in Vietnam and Brazil – appears to cause bacteria in tooth-associated biofilms to break down.

We are always looking for natural compounds – food and drink, even – that can have a positive impact on dental health.

Using milk teeth, the team cultivated biofilms on tooth fragments using the bacteria in saliva samples. When the fragments were exposed in solution to an extract of the Vietnamese coffee beans, there were indications that the bacteria had burst open.

Professor Antonio continued: “Whilst this is an exciting result, we have to be careful to add that there are problems associated with excessive coffee consumption, including staining and the effects of acidity on tooth enamel. And if you take a lot of sugar and cream in your coffee, any positive effects on dental health are probably going to be cancelled out.”

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The papers, photographs and effects of a dentist working in the army during WW2 were sold at auction at Bonhams in Knightsbridge on June 18 for £4,000-6,000.

Captain Julius Morris Green of the Army Dental Corps worked for the British Military Intelligence Section 9 (MI9) while a prisoner-of-war at Colditz and other camps in Germany. The archive auctioned contains 40 autograph coded letters by Green to his parents and a few to his sister.

Julius Morris Green was born in 1912. He studied at the Dental School of the Royal College of Surgeons in Edinburgh and joined the Territorial Army in 1939. He was captured with his brigade at St Valery in June 1941 and spent the remainder of the war in a succession of camps; his misbehaviour meaning that he eventually received the honour of being confined to Oflag IV-C, better known as Colditz.

In January 1941 he was taught the code used to communicate with MI9, the War Office department tasked with aiding resistance fighters in enemy occupied territory and gathering intelligence from British prisoners of war.

Papers of WW2 imprisoned dentist to be sold at auction

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Lack of Bill on professional regulation in Queen’s Speech

The General Dental Council (GDC) has said it is ‘extremely disappointed’ at the lack of a Bill to reform the legislation governing the health professional regulators in today’s (4 June 2014) Queen’s Speech, made on 4 June 2014.

The Law Commission has drafted a Bill to reform the health regulation system in the UK but it is now expected that it won’t be introduced to Parliament until after the election.

The GDC said in a statement: “We have been urging Government for the last three years to implement specific changes aimed at improving our ability to protect patients and reduce our costs. One significant change on its own would enable us to save up to £2 million a year – a cost that must be borne by the dental profession.

“At present our outdated processes mean that patients have to wait longer for their complaints to be heard, and dental professionals whose fitness to practise has been questioned will not be dealt with as expeditiously as possible.

“We are urging the Government to bring forward a Section 60 order to make some key changes to improve our ability to protect the public.”

Fizzy drinks contain more fructose than labels reveal

Fizzy drinks may contain a much higher dose of fructose than consumers are led to believe, a new study carried out by researchers at the University of Southern California has found.

For the study, published in the journal Nutrition, researchers analysed the chemical composition of 34 popular beverages. They found that drinks and juices made with high fructose corn syrup (HFCS), such as Coca-Cola, Pepsi and Sprite, all contain 50 per cent more fructose than glucose.

The Corn Refiners Association, a trade group representing HFCS producers, has long argued that HFCS is only negligibly different than natural sugar (sucrose), which is made up of equal parts of fructose and glucose. However, this research shows that there are considerably higher levels of fructose in these drinks, challenging the industry’s claim that ‘sugar is sugar’.

Lead author of the study, Michael Goran, said: “We found what ends up being consumed in these beverages is neither natural sugar nor HFCS, but instead a fructose-intense concoction that could increase one’s risk for diabetes, cardiovascular disease and liver disease.

“The human body isn’t designed to process this form of sugar at such high levels. Unlike glucose, which serves as fuel for the body, fructose is processed almost entirely in the liver where it is converted to fat.”

The research also shows that the ingredients on some product labels do not represent their fructose content. Pepsi Throwback, for example, indicates it is made with real sugar, yet the analysis showed it contains more than 50 per cent fructose.

Europe’s oldest dental implant unearthed

Western Europe’s oldest dental implant has been found by archaeologists in Le Chene, northern France.

The implant, which was an iron pin, was found in the burial chamber of an Iron Age woman, who is said to have been between 20 and 50 years old when she died. The archaeologists say it’s possible that the pin held a false tooth made from wood or bone.

Guillaume Seguin, who excavated the woman’s skeleton, told BBC News: “The skeleton was very badly preserved, but the teeth were in an anatomical position, with the molars, pre-molars, canines and incisors. Then there was this piece of metal. My first reaction was: what is this?”

The teeth were then taken away for analysis, where the team hypothesised that the pin was a dental prosthesis.

Advergames ‘manipulating’ children’s eating habits

C hildren need to be protected from the effects of ‘advergames’, a new report launched by researchers at Bath University says.

Advergames are electronic games that are used to advertise a product, brand or organisation, and are played on social media sites, companies’ own websites or downloadable apps.

Adverts for food and drink products high in salt, sugar and fat are banned around children’s television programmes but advertisers have found a loophole in regulations, meaning they can advertise these products with the electronic games.

Earlier research carried out by the same authors and commissioned by the Family and Parenting Institute (2012), found that advergames persuade on an emotional, subconscious level and can change children’s behaviour without their conscious awareness. It also found that children as old as 15 do not recognise that advergames are adverts.

One of the leading authors of the report, Dr Haiming Hang, said: “Companies are manipulating children into wanting food and drinks that are high in salt, sugar and fat, against the backdrop of a global obesity crisis. They know that when children are absorbed in playing games their cognitive capacity is fully engaged, and they’re not able to stop and think about the purpose of the game or to engage in any scepticism about the source of the message embedded in it.”

The report calls for a clear labelling system for children’s advergames and in-game advertising, a public debate on whether advertising techniques that persuade children subconsciously should be legal, and regulations that apply to advertising on TV to extend to children’s websites. It also calls for a public consultation on whether the Advertising Standards Agency, or an independent council, should oversee marketing to children across all media platforms. 

Half of adults in Wales have not seen dentist in two years

A lmost half of adults in Wales have not been to the dentist in the past two years, recent figures from the Welsh government suggest.

The statistics reveal that 54.9 per cent of the population was treated in the 24 months before 51 Dec 2013. Despite this, the government says this is an improvement from the same period last year, when 54.7 per cent was treated.

The statistics further show that in the past two years, 64.5 per cent of the child population was treated in Wales, while for adults that figure was 52.4 per cent.

Health spokeswoman for Plaid Cymru, Elins Jones, said: “It’s obvious from the number of people who are still unable to find an NHS dentist, even for children, that we need to increase the NHS capacity even further.”

According to the BDA, Lib Dem assembly member, Eluned Parrott, said: “This Welsh Labour government has completely overlooked the dentistry service in Wales. Just stating that everyone should have access to a dentist isn’t enough – there has to be action too.”
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Lloyd Pope BDS continues his description of Galip Gurel's concepts on treatment planning, one of the cornerstones of Galip Gurel's presentation at the 10th Annual BACD Conference

Galip Gurel believes that proper treatment planning is essential to avoid unnecessary and repeated failure.

To help his audience at the 10th Annual BACD Conference appreciate this fully, GG instigated an interactive treatment planning session where the audience took the role of the dentist and GG was the patient.

The interactive treatment planning session was based upon a real-life case GG had been involved with. This was an ex-popstar who now had a high profile job on daytime TV. She was very concerned about the crooked appearance of her teeth and was an ex-popstar who now had a high profile job on daytime TV.

The first stage was to ask about the patient's expectations including their perception of the current problem. This information needs to be combined with the clinician's perceptions of the problem.

You need to look at the big picture and not just focus too much on the small things. Typical questions are:

- What are you concerned about? What do you like? What do you dislike?
- Then you need to look at possible options e.g. Orthodontics - yes or no? Immediately or later?
- How might this dentistry affect your life, short-term or long-term, regarding the work you do etc?
- What do you think about the colour of your teeth? Bleaching, veneers etc.
- What smiles do you like in other people? Is this a realistic option for the patient?
- On a scale of 1 to 10 how do you rate your smile?
- What would you like it to be?
- Then, without explaining all the procedures involved initially, you must be able to show the patient what could be done using a suitable mock-up, even if it is done to deliberately show how awful the final result might be if the wrong treatment was performed.

This helps to demonstrate the treatment required.

Now even complicated cases become very easy. Identify the sequence of treatment to be followed:
* Orthodontics
* Periodontics
* Restorative

Then you need to discuss with the patient the different types of orthodontics available:
* Braces
* Invisalign
* Lingual braces etc

You need to discuss the positive and negative aspects of each option.

The patient also needs to understand their responsibilities and whether willing to accept them or not.

In this case, the patient was unwilling to wear labial braces, even aesthetic ones, or Invisalign etc. Therefore, GG decided to do a mock-up of lingual braces so that the patient could assess whether she could accept them or not.

Patients cannot reliably assess the effect on their phonetics themselves, this is only something a third party can assess. What is more, it is better if the third party does not know beforehand otherwise their opinion can be influenced by preconceptions.

In the study case, the patient was concerned that the lingual bars would affect how she spoke and that this would affect her performance on TV. She was instructed to wear the lingual braces to work, but not to tell any of her colleagues she was wearing them and to see if they made any unsolicited comments.

When she reported back she said she'd found them very uncomfortable to wear initially, but had soon got used to them and that none of her work colleagues had been in the least bit aware of them or conscious of any effect upon her speech.

The decision was made that lingual braces would be acceptable to the patient and so the treatment was commenced.

After the lingual orthodontics had been completed, GG reached the critical part. The orthodontist was happy with the aesthetics, but wanted to know if the treatment was enough or more was needed. Therefore they sent the patient back to GG.

At one stage during the orthodontics some "unacceptable" black triangles had appeared and it had been necessary to add some composite "adjustments" to hide them. It had also been necessary to trim some overly prominent teeth to make a more aesthetic result.

"The patient also needs to understand their responsibilities and whether willing to accept them or not"
ate a silicone template, so that the orthodontist can see exactly where they are in relation to what still needs to be done. Which tooth is in place, what still needs to be moved etc.

N.B. It is important that the orthodontist places the teeth a short distance back from the ideal finishing line in order to create the space for the final veneer. This will minimise the amount of tooth preparation required and help ensure the preparations remain within enamel, the optimum solution.

Posteriorly the orthodontist ideally needed to expand the lower arch to balance the occlusion, but this would have potentially extended the clinical time by up to 12 months. Therefore GG needed to discuss this with the patient and orthodontist to get everyone’s agreement. The patient was not willing to accept this extension so it was decided not to do this.

If teeth become properly aligned you frequently get an automatic improvement in the gum profile too. Therefore by tipping the teeth into a proper alignment you can negate the need for additional soft tissue surgery, but if necessary you can do a crown lengthening procedure.

Once everyone was happy that the teeth were in the correct position, the Lab created a new wax-up and associated silicone template. Then GG created a Luxatemp APT. GG said that he had been using Luxatemp for over five years because it is simply the best, so why would he change.

After the patient had approved the APT, the next stage was to prepare the teeth through the APT. To determine the size thickness of the step-cutter diamond bur depends on the degree of colour you want to achieve. If you use the tree-type step-cutter it needs to be angled in three different planes to get the perfect reduction – apical, middle and incisal angulations. Then remove the APT and finalise the margins etc using a fine diamond bur, preferably under a microscope which enables margin preparation to perfection. All of this results in minimal preparations, with the main reduction interproximally to allow for a proper wrap-around of the veneer. Finish final preparations with a hard polishing disc so that you can make adjustments chairside if necessary. 

Look out for the final part in the next issue of DTUK

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NASDAL highlights the difference a specialist advisor makes

The telltale signs you should be speaking to a specialist

- When you are having financial problems and your NHS contract isn’t working for you and your non-specialist accountant says: “Why don’t you put your prices up.”
- When the solicitor you have employed to assist you buy a practice produces a contract of just two pages (the NASDAL standard contract is 80 essential pages).
- When you are an associate and your accountant advises you to incorporate without warning you of the effect on your NHS pension.
- When you have claw back to pay but the accountant you are using hasn’t adjusted your taxable profit to reflect the lower earnings – so you have to pay an inflated tax bill as well as the claw back in the same year.
- When you have just bought an incorporated dental practice and discover that the NHS Contract is in the name of the dentist you bought from and not in the name of the company you had agreed to buy.
- When you ask your accountant about forming a partnership with your other half and they fail to warn you that to be legal, both partners must be non-specialist accountants – “Why don’t you put your prices up.”

Don’t throw a spanner in the works

Neal Kothari interviews John Milne, Chair of the BDA’s General Dental Practice Committee

What are we likely to expect from the new dental contract?

At a very basic level, I think we can expect something that is much more focused on prevention and providing care that moves us away from the current system which is based on targets. That would be a significant and very welcome shift.

The detail of what it will look like is still being honed of course, but I think there are some very strong indicators of what can be expected. It’s clear that the new system will be founded on a detailed assessment of patients’ current oral health and risk factors for disease in the future. That assessment is expected to be part of a shift that sees patients better understand how they can maintain their own oral health; more of a partnership between the practitioner and patient.

We can also expect a change in the way the contractual arrangements are underpinned to a system that is capital based. Those two things go hand in hand of course – if dentists are really to improve patients’ oral health in the long term as they wish to then long-term relationships are important. Capitalisation is a system that underpins that kind of approach in a way that episodic care simply does not.

With the move to capitalisation I think we can expect to see a recognition that managing patients’ recall intervals is vital; managing an entire patient base effectively will undeniably mean that seeing people at appropriate and necessary intervals will become crucial. The indications from the pilots thus far seem to indicate that can be made to work.

I think what we can – and indeed should expect – is that new arrangements happen. The Minister, Earl Howe came to BDA Conference in Manchester in April and made a very firm statement that commitment to change remains intact, and he also set out a timetable for moving the process forward from where he described as the piloting of discrete elements of a new system to the testing of prototype whole systems. That was good. I was also pleased that he made the time to attend one of the sessions I led on the pilot – that gave him a chance to hear the comments and questions from the dentists that came along. But promises only mean anything if they are kept, and they must be.

2. How would the BDA judge whether any new NHS system was successful?

I’ve said all along that the new arrangements must work for practitioners, patients and Government alike. They won’t be successful if they don’t.

From the profession’s point of view I think there are several markers that can be used to assess whether a new system is successful. It must be a place in which practices are sustainable and financially viable – if they are not the estate must be successful if they don’t.

And across the whole patient base I think a new system will be judged on whether it does what it is fundamentally intended to: improving patients’ health. If the new arrangements are to be judged a success in the longer term they will have to achieve that improvement.

For individual practices and practitioners I think financial viability is key. Practices rely on people investing in them so they must remain profitable and dentists’ salaries must be appropriate to the skills and training they bring and the personal investments they make. If practices go bust and a career in dentistry becomes unattractive, the future starts to look very bleak.

And I don’t think we should underestimate the importance of dentists being happy; a new system should be one in which dentists are confident they can provide the care they know patients need. The changes of 2006 didn’t deliver that; these must. I’ve stressed that to the Minister and civil servants on many occasions; nobody wants to see a mass drift of practitioners away from the NHS and another spate of patients queuing around the block to access dental care, but if the new system doesn’t deliver that’s a very real danger.

5. Given the impact of austerity, can we really expect high quality care to be funded within NHS dentistry?

I think we should always expect high-quality care to be properly supported. Dentists are inherently ethical and conscientious and that’s what they want to provide; even in a cash-limited system I don’t believe dentists set out to provide poor quality care. But there’s no escaping the fact that quality costs money; whichever way pots of money are juggled, the size of the pot matters and at the moment the pot is too small. Constantly squeezing an already inadequate pot is, obviously, counter-productive.

Looking forward to new arrangements, we also need to think about how the pot is spent. I think there is some challenging thinking to be done. What we are broadly seeing is that younger patients – for the sake of argument let’s say the under 40s – require less treatment than older patients, the cohort often termed ‘the heavy metal generation’, do. And that pattern suggests that patients’ needs will continue to evolve, because those younger patients will grow up to be older patients who require less treatment. That’s a potentially significant shift – both for what’s required of us as practitioners and for the way care is financed – because it could mean less complex and costly treatment being needed. How significant needs to be mod-
4. Is the BDA doing enough to protect dentists from the burden of legislation?

There is no doubt at all that legislation and regulation have been placing a heavier and heavier burden on dentistry over the last decade. I don’t think that growing burden is any way a reflection of what is happening in dentistry or that we have been singled out; successive Governments appear to have had an increasingly suspicious and distrustful view of all the professions.

That’s the context against which the BDA is lobbying. So for me, it’s all about the art of the possible. Is the BDA doing all it reasonably can to mitigate the worst excesses of regulation? Yes, it is. In recent years I think we’ve made a good case for the CQC to take account of the realities of dental care – as I said earlier we’re an inherently professional and conscientious profession and that’s very much borne out by the very favourable reviews we have got in successive CQC reports. Other sectors, as we all know, have performed less well. Our message that needs to be taken into account when thinking about the cost basis and requirements of regulation is starting to bear fruit. And I’d also cite the lobbying we did against financial regulation by Monitor as part of the work we did to influence the Health and Social Care Act; we avoided an inherently inappropriate and potentially onerous burden there.

The regulation of dentistry – and indeed healthcare generally – is entering a new period of flux now. The publication earlier this year of proposals by the various Law Commissions across the UK has sketched out potential reforms to the way that regulation works – including potentially changed powers for the GDC. Whether those proposals will become legislation is yet to be seen. The BDA will, as ever, be making plain the importance of regulation being effective, proportionate and cost-effective. That’s what it should be.

5. Is dentistry really under attack? And what can the BDA do to help?

It certainly feels like it. As I travel the country meeting practitioners at LDC and BDA events for leading workshops on the pilots I have the opportunity to meet thousands of practitioners and bear their stories. Is the experienced dentist who has provided fantastic care for his patients for years but is now so stressed by being unable to meet his UDA target that he is retiring with stress under attack? I think so. Are the dentists who were inappropriately issued with registered manager penalties by CQC being attacked? I think so too. When there appears to be a greater risk of referral to the GDC or litigation by patients are dentists under attack? Again, I think so. Attacks come in different forms of course – when I spent seven hours treating a fifteen-year-old with 21 cavities and got three UDA’s for my efforts, the viability of my practice seemed to be under attack.

What the BDA can, and does, do is to lobby to make our lives better on the one hand, while providing the expert advice and support we need to carry on with our working lives and get through the obstacles thrust into our path. That’s what a professional association is for and that’s why I’m involved, and would urge every other dentist to be as well.

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¹ All drugs are only available to prescribing medical professionals
² Bag is an optional extra and will incur a charge
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I often chat with practice owners over how to go about selling their practice. If this is you, here are my top tips that need your attention long before you even find a buyer:

1. Devil in the Detail
   More often than not a well-run practice with proper management and organisational systems in place will enjoy a smoother sale process than one which isn’t.

   Long before you market your practice, you need to start preparing for the “due diligence process”. This is the long and joyless process where a buyer raises enquiries into all aspects of your Practice. They’ll leave no stone unturned and you’ll be expected to provide documents to support the answers you provide. Policies, procedures, staff contracts, self-employed agreements, NHS BSA statements, CQC paperwork, accounts and inspection certificates are just some of the paperwork you’ll be expected to provide. Where you can’t provide them, the buyer will expect you to go and find them.

   This is why the more organised your practice and the better systems you have in place, the less of a headache the due diligence process will ultimately be. Have mind to this process now. Speak to us and we’ll happily provide you with a sample set of enquiries so you can begin getting your house in order long before you agree a sale.

2. Ask The Experts
   Years ago it was the case that the most valuable aspect of a practice was the premises. Not so in this era of sky-high goodwill values. You need to ensure that you have high quality advice from specialists who understand your industry.

   Speak to a sales agent who specialises in the dental industry to obtain an accurate and realistic valuation based upon their knowledge of the industry. They’ll give you an indication of likely timescales for sale and demand for your practice which will allow you to plan your exit timescales accordingly.

   Speak to a dental specialist accountant who will advise you on your taxation position on the sale. There will be significant tax implications surrounding the way in which you sell your practice and top quality advice at very beginning is essential.

Thinking of selling? Get your house in order!
Thomas Coates from LCF Law discusses selling your dental practice
Using hand files to their full capabilities: A new look at an old yet emerging technology

Author Dr Rich Mounce, USA

Introduction: Appreciating the unseen dimension
Hand files allow the clinician to manually “feel” the unseen dimension in canal anatomy beyond what radiographs alone can illustrate. Specifically, by virtue of hand file resistance to apical advancement, the clinician can, by tactile feel, determine the curvature, calcification, length, the anatomy of the MC, and if intra-observant events may have occurred. Only cone beam technology comes close to providing the tactile information provided by hand files (Flamecore).

Such tactile information helps determine treatment strategies prior to shaping. Astute RNT use has, as its foundation, intimate canal knowledge first by hand files. Forcing RNT files to length without adequate hand file negotiation and a glide path is the harbinger of file fracture, canal transportation and inadequate cleaning and shaping.

Hand file applications, differentiation and general use principles
Hand files differ based on the following (among other attributes): 1. Material of manufacture (carbon steel, stainless steel, nickel titanium, among several other less common materials). 2. Taper (0.02 tapered, variable tapered, greater tapered). 3. Helix angle, rake angle, cutting angle (if different from the rake angle) number of flutes (as well as flue width, depth and number). 4. Possible variability of the cutting along the length of the file. 5. Linear length of the cutting flutes. 6. In addition to the attributes above, hand files are designed to be stiff versus flexible, aggressive cutting versus less aggressive, finishing files versus bulk shaping files, among other general classifications.

Principles for maximising hand file effectiveness
The use of hand files is based on several universal assumptions. These assumptions are:
1. Optimisation of the access preparation, ideally through the surgical microscope (Zeiss, Global Surgical).
2. Optimise radiographic evaluation of the tooth prior to access preparation including where necessary, cone beam visualisation. For those without CBCT technology, having two or optimally three different pre-operative radiographic angles will provide the best possible visualisation of canal anatomy short of a CBCT scan.
3. Straight line access.
4. Removal of the cervical dental triangle prior to hand file exploration.
5. Copious irrigation at every stage of the procedure, especially rinsing debris from the access preparation before hand files are inserted.
6. Curved files negotiate curved canals more effectively than straight ones. The EndoRenders pliers (Axis/Sybron) are an effective instrument to place the needed curvature onto hand files. Generally, in canals that have been ledge or transported, placing an acute, 5- to 5-mm curve onto the apical portion of the hand file is beneficial. Multiple insertions of curved hand files to bypass blocked and transported canals (especially ledges) are the rule, not the exception. Alternatively, if no transportation has occurred (the canal is untouched or easily negotiable) the clinician can
b) Canals should always be negotiated with hand files prior to using RNT files. Even if the clinician uses a RNT glide path cutter (PathFile, DENTSPLY Tulsa or PreShapers, SpecializedEndo), the canal should be first negotiated by hand to assure patency. Clinicians do not dictate whether a glide path should be created by hand files or RNT files.

i) In the view of the author, hand files were more flexible and more controllable instruments as they dull rapidly during clinical function.

ii) The use of nickel titanium hand files is a matter of personal preference. While some clinicians desire the flexibility and shape memory of nickel titanium hand files, others do not. It should be noted that nickel titanium hand files are available with controlled memory, nickel titanium hand files are not. It should be noted that nickel titanium hand files are available with controlled memory, a proprietary thermo mechanical process in which nickel titanium hand files lose their shape memory yet retain their flexibility.1

This process in which nickel titanium hand files are available with controlled memory, nickel titanium hand files are not. It should be noted that nickel titanium hand files are available with controlled memory, a proprietary thermo mechanical process in which nickel titanium hand files lose their shape memory yet retain their flexibility.1

The principles of canal preparation must be observed, irrespective of the methods utilized to achieve these principles (ie hand file canal enlargement and/or RNT enlargement or a combination of these methods). These principles are to:

- leave the canal in its original position (simply enlarge it as described here)
- leave the minor constriction (MC) of the apical foramen at its original position and size
- create a tapering funnel with narrowing cross-sectional diameters from orifice to apex
- create a master apical taper that optimizes irrigation and obturation hydraulics, and yet causes no iatrogenic events (straying perforation, canal transportation unnecessary dentin removal—and does not leave the tooth at risk of long term vertical fracture)
- Aggressive cutting files

K Reamers

Mani K Reamers are three-sided and contain fewer spirals than K files. Smaller reamers are generally square in cross section. Larger reamer sizes are generally triangular. The angle between the cutting flutes and long axis of a K file is generally in the 25-40 degree range.1 Lexicon K Files are an additional example of another commercially available K file (DENTSPLY Tulsa).

H Reamers

Mani H Reamers are three-sided and contain fewer spirals than K files. Smaller reamers are generically square in cross section. Larger reamer sizes are generally triangular. The angle between the cutting flutes and long axis of a reamer is most often in the 10-50 degree range.1

Reamers are used in rotation, unlike K files. Hand file rotation is associated with less canal transportation than K file watch winding.

The use of K reamers versus K files is a matter of personal preference. K type instruments of both types (reamers versus K files) should be manipulated carefully when used counter clockwise due to the risk of instrument fracture. Lexicon K Reamers are an additional example of a commercially available K reamer (DENTSPLY Tulsa)—these are triangular in cross section.

H files

H files (Mani H Files as well) have conical spirals ground into them. They are used on the pull stroke for gross removal of canal contents in the coronal third and in retroretration. H files should not be rotated due to fracture risk inherent in their design. The angle between the cutting flutes and long axis of an H file is generally in the 60-70 degree range.1

It is not advisable to use H files near the MC. The MC can be transported easily if H files are used at or beyond the MC. Clinically, aside from transportation, such an action lead to significant apical bleeding (Fig. 2).

Hand files of accentuated and variable taper

Mani Flare Files are more tapered than standard hand files—0.05 taper compared to 0.02 taper. They are used to prepare tapered canals for doctors who hand file the entire preparation among other more specialised uses such as verifying taper before cone fit.

Accented taper is also available with nickel titanium GT Hand Files. ProFile 0.04 Hand Files are 0.04 tapered and come in a variety of tip sizes, again in nickel titanium. ProTaper Universal Hand Files feature the ProTaper variable taper design in shaping and finishing files in various lengths (all of the above are manufactured by DENTSPLY Tulsa).

Flexible Files

Mani Flexible Files are triangular in cross section. Files with a triangular cross section are more flexible than those with square cross sections. Flexible stainless steel hand files are generally used in easily negotiated canals. Clinician preference dictates whether to use flexible stainless steel files relative to nickel titanium hand instruments (Fig. 5).

Additional files in this class are Lexicon FlexSS Files (DENTSPLY Tulsa). These files are also available in medium sizes (12, 17, 22, etc.).

Aggressive cutting files

Mani RF files possessing a parallelogram cross-section and a 710 degree cutting angle, making them more aggressive relative to many of the other files included here. RF files would be used primarily by doctors who are hand filing the entire canal in conjunction with other hand files (Fig. 4).

Nickel titanium files

GT Hand Files (made of nickel titanium) are available in various tapers and tip sizes (DENTSPLY Tulsa). Lexicon FlexNTR Files are made of nickel titanium and come in various tip sizes while maintaining a constant taper. As mentioned above, clinician preference dictates whether a flexible stainless steel file is more desirable than a nickel titanium hand file.

Medium sizes, K and H reamers

Mani provides K Files, H Files and stainless-steel reamers in medium sizes (12, 17, 22, etc.). ProFile Series 29 Stainless Steel 0.02 Hand Files have a constant 29 per cent increase in tip size in 0.02 taper. Use of medium sizes avoids the dramatic increase in tip diameter with increasing tip sizes, especially between a #10 and #15 hand file (a 50 per cent increase in size of the #15 relative to the #10 hand file).

Safe-ended hand files and reciprocation

Mani SEC O Files (DENTSPLY Tulsa) are used after the canal has been negotiated with hand files. SEC O Files are single use disposable instruments as they dull rapidly during clinical function.

It is observed that when the files are inappropriately placed (well beyond the MC), the wrong type of hand file is used after the canal has been negotiated with hand files. RT files are not reciprocated (Figs. 5 & 6).

Reciprocation is a very safe technique, whereby the clinician can use a reciprocating hand piece attachment to replicate manual hand file watch winding. Clinically, reciprocation is used after the canal has been negotiated to the TWL and reciprocation proceeds with the first file that binds at TWL. In this article, the terms TWL and MC are synonymous. The purpose of reciprocation is to save time, reduce hand fatigue and prepare a space into which RNT files can subsequently be inserted with minimal torque stresses (prepare a glide path).

Reciprocation is inherently safe. It is difficult to fracture hand files when this technique is used appropriately. Fracture or iatrogenic misadventure generally occurs when the files are inappropriately placed (well beyond the MC), the wrong type of hand file is reciprocated (H) and/or the speed is grossly exaggerated above the recommended levels.

Reciprocating hand piece attachments fit onto an E-type coupling and can be powered at 900rpm, for example at the 181 setting on an electric endodontic motor.

To initiate reciprocation, the file is left in the canal at the TWL and the reciprocating hand piece is placed over the file (the file is inserted into the head of the reciprocating hand piece and is held there while reciprocating). The attachment reciprocates the file clockwise and counter clockwise—for example, with a 50-degree clockwise and 300 counter clockwise movement. These attachments do not rotate the file a full 560 degrees—in contrast to how...
RNT files are powered. Different reciprocating handpieces may have variations on the degree of clockwise or counter clockwise rotation and possibly include a vertical amplitude.

The Synea W&H-62A is an example of a reciprocating handpiece (MounceEndo) attachment with a 50s clockwise and 50s counter clockwise motion. Reciprocation is the technique and file motion utilised in the Wave One canal preparation system (DENTSPLY Tulsa).

 Clinically, using the SEC O & K file as an example, the SEC O & K file is placed to the TWL, the attachment placed over the file and reciprocation commences as described above. The file is reciprocated for 15 to 50 seconds, using a 1.5mm vertical amplitude movement. Clinically, the file will become less tightly bound as the canal is enlarged.

If, for example, a #08 SEC O & K file is the first file that binds in the canal at TWL, this file is reciprocated. Once the #08 SEC O & K file is reciprocated, the canal will now accept a #10 SEC O & K file to TWL. The #10 SEC O & K file is reciprocated. Once reciprocation is complete, the canal will allow a #15 SEC O & K file to reach the TWL. Once the canal is enlarged to approximately the size of a #15 or #20 hand file, the canal is ready for RNT enlargement.

Aside from glide path creation, this technique is especially helpful in early enlargement of calcified canals, especially the MB2 canal of upper molars. Reciprocation is also valuable for rubbing out intraradicular ledges. Once the hand file can negotiate around the ledge, it is left in place and reciprocated as suggested above.

It is not advised to place a hand file in a reciprocating handpiece attachment and try to move the file apically while powering the file. While such a motion will work some of the time, it can accentuate ledges and other canal transportation and increase the risk of file fracture.

Integration of the glide path with early RNT shaping
If the clinician is using RNT shaping methods, the decision must be made to move either crown down, step back or possibly use a hybrid of the two strategies. While a comprehensive discussion of such RNT strategies is beyond the scope of this article, it has value to mention that judicious initial removal of restrictive dentin at the point of greatest root curvature (especially in complex cases) is essential to minimise subsequent intraradicular events. Caution is advised. RNT fracture is a risk when the wrong taper and tip size RNT file is inserted into an acute curve (immediately after glide path creation) with unnecessary force.

In essence, a strict crown down sequence may not be indicated.

Anatomically, the aforementioned greatest curvature tends to be in either the middle root third or at the junction of the middle and apical thirds. Clinically, in complex multi-planar curvatures, after glide path preparation, regardless of whether the glide path was made with reciprocation or with a nickel titanium instrument, using a relatively smaller taper and tip size RNT file (for example, a 0.02/20, 0.05/20, or 0.04/20 file such as the MounceFile CM (controlled memory) can minimise the risk of subsequent fracture that may otherwise result in moving directly to a strict crown down approach around such a curvature. Fracture risk is minimised with the removal of restrictive dentin along the curvature through use of the instruments above (Figs. 7 & 8).

Alternatively, instead of using the MounceFile, the clinician can make an equivalent enlargement through the curvature using a 0.04/25 Twisted File (Axxe/Sybron) or similarly sized RNT file.

This article, written for the general dentist, has described common attributes of hand files, their clinical use, reciprocation, and integration of glide path preparation with initial shaping procedures.

Emphasis has been placed on interpreting tactile feedback and avoidance of intraradicular events. Your feedback is welcome.
Twisted Files changed the world of endodontics

A case report by Dr Sorin Sirbu

There are many rotary systems on the dental market at present. All of these systems are relatively similar, except for one. This system is called Twisted Files (TF) and it was introduced to the dental market in 2008. I am glad to have been among the first users of this system, which has changed the endodontic world. How does this system differ from other rotary systems? Firstly, by its unique machining—a SybronEndo patent.

The NiTi wire is brought into a special state (called R-Phase) that allows the twisting of the file. This makes TF distinct from all the other systems, for which the shape of the file is machined by milling, a mechanical process. This unique procedure lends particular resistance to TF, as well as an extraordinary flexibility. Owing to this manufacturing technique, a TF untwists before breaking, warning the dentist in this way. In addition, being made by twisting and not by polishing/milling, all the micro-cracks are eliminated, resulting in a more resistant, more robust file. The manufacturing process is completed by applying an advanced surface conditioning treatment that makes the edges active (cutting).

The tip of a TF is inactive, which allows it to follow the route of the canal easily and to minimise canal transportation. The working sequence with this system is terribly easy and consequently working time is reduced.

The files may be recognised by their colour: red = 25, blue = 30, green = 35, yellow = 40. The files may be differentiated by their height: 80mm for the short files, 100mm for the long files. The diameter of the TF is defined by a numerical index: TF 20.06 (ISO) means a TF file with a diameter of 20mm and a taper of 0.06mm.

In this part, I will describe the TF technique. Treatment with TF always begins by creating a glide path in the canals with #6 to 20 K-files. After opening and access, treatment inside the canal begins. In the absence of adequate access into the canal, there is the risk of overworking the file and its subsequent fracture. By opening the canals with K-files, important information about the anatomy of the root canal is obtained, such as the existence of curves and the diameter of the root canal.

Generally, the first TF that is introduced into the canal is TF 25.08 (the apical diameter is 25mm and it has a taper of 0.8 per cent), which in most cases will reach the working length previously detected by means of an apex locator. The endodontic engine must be set at 500rpm and the torque at 2Ncm. The file is introduced into the canal in rotation and without pressure applied. It is sufficient to advance 2-4mm when introducing the file into the canal. If the file does not advance, then a file with a smaller taper (TF 25.06) must be used instead to achieve working length.

During preparation, there must be sodium hypochlorite in the root canal at all times. The file is cleaned and examined to detect possible distortion before introduction to the canal and upon withdrawal. If the file exhibits some distortion, it must be replaced (Fig. 2). TF 25.06 reaches working length easily, then a file with a greater taper can be used (TF 25.10 or 25.12).

After reaching the desired taper, the final apical diameter is prepared. There are many studies in the endodontic literature that have found that apical preparation up to a #25 K-file is insufficient. For this reason, after reaching the taper the TF 50.06 or 55.06 or both are used. If greater apical diameters are desired, TF 40.04 or 50.04 can be used. The greater the apical diameter is, the greater the quantities of irrigation that reach the apex will be and the cleaner the apex will be. It is generally known that apical preparation by means of rotary files with large diameters can create many problems because of the stiffness of the rotary files, such as transportation of the apex and changes to the root-canal anatomy. With TF, however, this does not occur, owing to the unique machining process, which ensures that the files are flexible, even those with large apical diameters.

Case 1
The patient came to our clinic with acute apical periodontitis around tooth 26. When examined clinically and radiographically, the tooth showed a large composite filling next to the distal pulp horn (Figs. 3 & 4). The periodontal examination did not find any irregularities; however, the tooth was extremely painful in vitality tests. Initially, I intended to replace the...
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Dr Sorin Sirbu graduated from the Carol Davila University of Medicine and Pharmacy in Bucharest in Romania. At present, he works in a private dental practice in Bucharest.

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The treatment was performed in one session. Four canals were identified (MB, MB2, DB and P; Fig. 6). The main problem was in the MB2 canal, which had a 90° curvature. The treatment was performed with TF 25.06 in the MB2 canal and with TF 25.08 in the other canals (Fig. 7). As a final irrigant, I used SmearClear (SybronEndo). After obturating the canals with warm vertical condensation using the Elements Obturation Unit (SybronEndo; Fig. 8), the canals were sealed with a coloured composite (RxFlow, Dental Life Sciences – Fig. 9). Finally, the tooth was restored with a composite filling (Fig. 10) and the control X-ray was taken (Fig. 11).

**Case 2**

The patient was referred to our clinic by another doctor who had come across difficulties when identifying and working in the canals of tooth 57. The presence of a temporary filling done during previous treatment was observed during the clinical examination (Fig. 12). An initial X-ray was taken to identify any possible associated pathology, the presence of canals, etc. (Fig. 13).

After removing the temporary filling, three root canals were identified, shaped and cleaned (Fig. 14). The treatment was performed with TF 25.10 up to 40.04. The MB and ML canals merged, as shown by the file impression on the gutta percha cone (Fig. 15). The final irrigation was done with SmearClear. The tooth was obturated with warm vertical condensation using the Elements Obturation Unit (Fig. 16), and finally restored with composite material and a fibreglass post (Fig. 17).

The control X-ray showed that the root canal and numerous accessory canals (Fig. 18) had been properly cleaned and obturated due to working with TF rotary files and negative irrigation with EndoVac (SybronEndo).

**Fig. 12** Tooth 37 at the initial clinical examination.

**Fig. 13** The initial radiographic examination of tooth 37.

**Fig. 14** Shaped and cleaned canals.

**Fig. 15** The impression left by the file on the gutta-percha core attested to the merging of the MB and ML canals.

**Fig. 16** Final endodontic obturation by means of the warm vertical condensation technique.

**Fig. 17** Tooth 37 restored using composite material and a fibreglass post.

**Fig. 18** The final X-ray.
Eight-year follow-up of successful intentional replantation

Authors Dr Muhamad Abu-Hussein; Dr Sarafianou Aspasia; Dr Abdulgani Azzaldeen

Fig. 1_Pulpal diagnosis: necrosis, narrow periodontal pocket 10mm deep, Grade 1+ mobility.

Fig. 2_A radiograph after six months: same pocket depth, Grade II mobility, plenty of crevices.

Fig. 3_Extracted, apex filled with MTA, no crevices and Grade 1+ mobility at the six-month recall.

Fig. 4_A radiograph after six weeks showing the healing periradicular lesion.

Fig. 5_A radiograph after six months showing no fractures, no alveolar PDL, Grade I mobility.

Fig. 6_A radiograph after six months: same periradicular lesion.

‘Although the success ratio for intentional replantation is far below that for routine or surgical endodontics, this procedure should be considered an alternative to tooth extraction’

Intentional replantation has been practised for many years as a treatment modality for pulpless teeth. Although the success ratio for intentional replantation is far below that for routine or surgical endodontics, this procedure should be considered an alternative to tooth extraction. A case of mandibular second molars treated with intentional replantation and retrograde fillings is reported in this article. At the eight-year recall visit, radiographs showed no evidence of pathological changes.

Introduction

Intentional replantation (IR) is the extraction of a tooth to perform extra-oral root-canal therapy, curettage of an apical lesion when present and its replacement in its socket. Grossman in 1982 defined it as follows: "A purposeful removal of a tooth and its reinsertion into the socket almost immediately after sealing the apical foramina." He also stated that it is "the act of deliberately removing a tooth and follow- ing examination, diagnosis, endodontic manipulation, and repair, returning the tooth to its original socket to correct an apparent clinical or radiographic endodontic failure". It is a one-stage treatment that will maintain the natural tooth aesthetics if successful.

This method was first reported nearly a thousand years ago. In the eleventh century AD, Abulcasis gave the first account of replantation and use of ligatures to splint the replanted tooth. Fauchard, in 1712, reported an IR performed 15 minutes after extraction. In 1788, Bredemore reported IR of mature and immature teeth. In 1785, Woofendale reported IR of diseased teeth. In 1778, Hunter believed that boiling the extracted tooth prior to replantation might help to remove the tooth disease.

In 1890, Schell addressed the role of the periodontal ligament (PDL) in the prognosis of replanted teeth. In 1955, Hammer described the importance of leaving an intact PDL in intentionally replanted teeth. He believed that a healthy PDL is essential for reattachment and retention of replanted teeth. He stated "an average 10 years life span could be expected when replantation was accomplished in a technically flawless manner." In 1961, Loe and Waerhaug tried to replant teeth immediately to keep the PDL vital. Consequently, ankylosis was not seen; however, all teeth showed resorption repaired with cementum. These results were confirmed by Deeb in 1965 and Edwards in 1966. In 1968, Sherman showed that normal PDL could be kept vital.

Intentional replantation is specifically indicated:

- When all other endodontic non-surgical and surgical treatments have failed or are deemed impossible to perform
- When the patient is not able to open his or her mouth fully, preventing the performance of non-surgical or peri-radicular surgical endodontic procedures
- In the case of root-canal obstructions
- When there are restorative or perforation root defects in areas that are not accessible via the usual surgical approach without excessive loss of root length or alveolar bone

Contra-indications may include:

- Long, curved roots
- Advanced periodontal diseases that have resulted in poor periodontal support
- Tooth mobility
- Multi-rooted teeth with diverging roots that make extraction and replantation impossible
- Teeth with non-restorable caries

In order to provide the best long-term prognosis for a tooth that is to be replanted intentionally, the tooth must be kept out of the socket for the shortest period possible, and the extraction of the tooth should be atraumatic to minimise damage to the cementum and the PDL. The PDL, attached to the root surface be kept moist in saline, Hanks' balanced salt solution, ViaSpan or a doxy-

We have documented three clinical cases to exemplify the potential of IR as a viable treatment option in select endodontic cases. The purpose of this article is to report a case of successful IR as an alternative to extraction.

Case report

A 48-year-old woman was referred for evaluation and treatment of a painful mandibular left second molar. The patient described recent severe throbbing pain associated with the left second molar area, extending to the left ear, of three days' duration. The patient stated that she had had a cavity in tooth 57 (Fig. 1) and her dentist had performed root-canal therapy a few months before her presentation. Upon examination, tenderness to percussion and palpation were noted and sulcus depths around tooth 57 did not exceed 2mm. Radiographic examination revealed an endodontic failure associated with a peri-radicular radiolucency (Fig. 2).

The patient was anaesthetised, and tooth 57 was extracted and received in a sterile gauze sponge saturated with antibiotic solution, Viaspan or a doxy-
saline solution. The wound was packed with sterile gauze and the patient asked to close her teeth together to immobilise the pack. Resection of both the mesial and distal roots was performed by bevelling the root tip with a #702 bur in a straight handpiece. Retro-preparation of the mesial root was accomplished using a 1/1.2 round bur in a contra-angle handpiece with copious irrigation. An MTA retrograde filling was placed in the root canals (Fig. 5). Once the extra-oral procedure had been completed the socket was irrigated gently with a normal saline solution to remove the clot and the tooth was replaced. No splint was needed.

Six weeks later, the patient was asymptomatic and the replanted tooth was firm in its socket. At the time, the patient was advised to proceed with the final restoration on the replanted molar (Figs. 6-8).

After one year (Fig. 9), three years (Fig. 10), four years (Fig. 11) and eight years (Fig. 12), the patient attended for evalu-

ation and radiographs were taken of the tooth. The radiographs showed no evidence of resorption and the patient was asymptomatic.

Discussion

Intentional replantation is an accepted endodontic procedure in cases in which intra-canal and surgical endodontic treatments are not recommended. Although not frequently used, IR is a treatment option that dentists should consider under these conditions. If the standard protocols during IR are not followed, root resorption and ankylosis may be observed within one month and one to two years, respectively. Most resorptive processes are diagnosed within the first two to three years. However, although rare, new resorptive processes could occur even after five or ten years.17

As various investigators report varying success rates, it is difficult to predict the outcome for IR.

Bender and Rossman20 evaluated 51 cases with an overall success rate of 80.6 per cent (six recorded failures). Replanted teeth survived from one day to 22 years. A second mandibular molar that failed after three weeks was replanted successfully a second time with no signs of failure after 46 months of follow-up.

Majorana et al.26 followed 45 cases of dental trauma for five years, recording complications and responses to treatment. Root resorption was observed in 45 cases (17.24 per cent). Of these, nine were associated with luxation injury (20 per cent) and 56 (80 per cent) with avulsion. The authors identified 50 cases of inflammatory root resorption (18 transient and 12 progressive) and 15 cases of ankylosis and osseous replacement.

Aqrabawi27 evaluated two cases of IR and retrograde filling of mandibular second molars. At the five-year re-call visit, radiographs showed no evidence of pathological changes.

Nuzzolese et al.28 state that the success rate of IR at five years reported in the literature ranges from 70 to 91 per cent.

Al-Hezaimi et al.29 treated a radicular groove that predis-

possed a 15-year-old girl to a severe periodontal defect with a combination of endodontic, IR and Emdogain (Straumann) therapy. At the one-year follow-up, the patient was comfortable and active healing was evident.

Demiralp et al.30 evaluated the clinical and radiographic results of IR of periodontally involved teeth after conditioning root surfaces with tetracy-

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cine hydrochloride. Thirteen patients (seven women and six men; age range: 55–52 years) with 15 periodontally involved non-salvageable teeth were included in this study. During the replantation procedure, the affected teeth were gently extracted and the granulation tissue, calculus, remaining PDL and necrotic cementum on the root surfaces were removed. Tetracycline hydrochloride, at a concentration of 100mg/ml, was applied to the root surfaces in which a combined endodontic-periodontic lesion on the root had been extracted and deprived of vital cementoblasts. It was also demonstrated that Emdogain therapy, that is, conditioning with EDTA and placement of enamel matrix proteins on the detached root surface, did not interfere with the healing process.

Araujo et al. demonstrated that root resorption, ankylosis and new attachment formation, among other processes, characterised healing of a replanted root that had been extracted and deprived of vital cementoblasts. It was also demonstrated that Emdogain therapy, that is, conditioning with EDTA and placement of enamel matrix proteins on the detached root surface, did not interfere with the healing process.

Yu et al. reported a case in which a combined endodontic-periodontic lesion on a mandibular first molar was treated by IR and application of hydroxyapatite. Four months after the surgery, a porcelain-metal full crown restoration was completed. At the 15-month follow-up examination, the tooth was clinically and radiographically healthy and functioning well.

Shintani et al. performed an IR of an immature mandibular incisor that had a refractory periapical lesion. The incisor was extracted and the periapical lesion was removed by curettage. The root canal of the tooth was then rapidly irrigated, and filled with a calcium hydroxide and iodoform paste, after which the tooth apex was obturated by an apical bridge formation.

Kaufman reported successful results of a maxillary molar tooth treated with IR after a four-year follow-up period. A mandibular first molar, which was replanted, by Czontkowski and Wallace showed no signs of resorption and ankylosis after six months. Different investigators reported success rates varying from 52 to 95 per cent with follow-ups of between one to 22 years in posterior teeth.

Bender and Rossmann reported a success rate of 77.8 per cent in molars. Among 14 mandibular molars, the success rate in first molars was 85.7 per cent, and 71.4 per cent in second molars. Of the four maxillary molars, three first molars and one second molar, one maxillary first molar failed, resulting in a 66.7 per cent success rate in first molars.

Baghoobar and Vissink re-planted 29 teeth, consisting of two mandibular first molars, 17 mandibular second molars, one mandibular third molar and nine maxillary second molars, and followed them for an average of 62 months. The success rate was 72 per cent and 25 of them were still in function.

Conclusion

For extraction and replantation to be successful, the following criteria must be met:

- Informed consent must be obtained from the patient.
- All roots need to be conically shaped.
- The teeth need to be somewhat mobile.
- A good knowledge of oral surgery is needed with respect to extraction.

Intentional replantation is a treatment alternative that should not be underrated, especially when conventional endodontic or surgical treatment is not possible. This is an excellent treatment with a predictable result. I have performed approximately 50 re-plantations, and have lost only one tooth to date.

In order to be successful with extraction and replantation cases, the practitioner must have the right patient and the right rapport with that patient. The practitioner must also be able to assess the tooth and be confident that it can be extracted without breakage. Additionally, the practitioner must be able to recognise tooth morphologies that may lead to extraction problems. This is a skill that is perfected through experience. Replantation is a predictable and acceptable method of treatment in my office when patients present with root canals that require retreatment due to failure or those that cannot be completed owing to sclerosing of the canals.

Editorial note: A complete list of references is available from the publisher.
Avoided disaster supports NASDAL's Avoid a Spanner in the Works campaign

How viable is your dental practice?

The following story of how a dentist narrowly avoided disaster supports NASDAL’s Avoid a Spanner in the Works campaign...

A dentist nearly placed herself in financial jeopardy by buying a dental practice which couldn’t deliver the income she needed. Fortunately, she contacted a NASDAL member and here she tells the story of how she averted disaster thanks to a viability forecast.

I was working as an associate in a mainly private practice and was delighted to be given the first refusal, by my principal, to buy it. I passed the practice’s accounts onto my accountant and financial advisor who both agreed that it was an opportunity not to be missed. But throughout, I had a nagging feeling the practice was not going to deliver the predicted annual profit of £140,000. I explained carefully to the advisors I had at that time I could only work three days compared to my principal who was working five days. I was reassured that this wasn’t a problem and arranged to see the bank manager to arrange a loan.

The bank manager thought the figures were brilliant and discussed how I would be taking out over £90,000 in dividends and had plenty left over to employ extra staff. I again stressed that I worked fewer days than my boss but this appeared not to matter. In fact, the bank manager was sure the amount I’d be able to pay myself did not even cover my household bills! I was devastated, but also angry that if I hadn’t had had the NASDAL accountant’s advice I could have proceeded with the purchase and ended up in financial hardship.

I would strongly advise any dentist wishing to buy a practice to make sure you get a viability forecast and it is done by an accountant who specialises in this field.

The NASDAL accountant explained that although figures showed that the annual practice profit was £140,000, this was only the starting point. That figure would come down substantially because the dentist wishing to acquire the practice could only work a three day week.

The more work a practice-owner pays an associate to carry out, the more the practice profits drop. Also, unlike the practice vendor, the buyer would have to make bank loan capital repayments of £35,000 a year out of taxed profits.

A detailed financial forecast of income and expenditure was prepared, using the NASDAL benchmarking statistics as an additional guide.

This revealed the current annual profit of £140,000 was going to be substantially depleted to the point where it simply wasn’t a viable proposition for the prospective buyer. Despite considering a number of alternative ways of reducing costs and increasing income, it just couldn’t be made to work.

The conclusion: anyone buying a practice should work hand in hand with a specialist dental accountant with experience of preparing dental practice financial forecasts.
Successful peri-implantitis prophylaxis

Author: Prof Dr Dr C U Fritzemeier

During the last decades, implantology emerged as one of the most innovative enrichments in the field of dentistry. Considerable increase is expected in the future. Compared to earlier pre-prosthetic methods, endosseous implantology is a simple treatment that usually is not very stressful for the patients and offers many advantages, e.g., the physiological transfer of chewing forces into the bone, which - under certain conditions - even generates renewed bone growth.

Against this background and since implantology with all its prosthetic treatments varieties is considered an established method.

One of the most common and most feared complications occurring in implantology is peri-implantitis (Fig 1), which usually leads to implant loss in case it remains untreated.

Introduction

Initially, the peri-implant tissue disease manifests itself as mucoitis with progressive bone loss at the implant area, as described by ALBREKTSSON et al. The reasons for this disease pattern are complex, and various hypotheses about the development of peri-implantitis were proposed, amongst them insufficient oral hygiene, lack of fixed gingiva, and/or overstressed implants. These putative triggering factors contradict the statements of well-known implantologists. An absence or insufficient width of keratinised gingiva is not aetio-logically linked to the development of gingivitis and peri-implantitis or the functional strain placed on an implant cannot be solely held responsible for progressive bone loss. That means that additional pathologic influences, which trigger and sustain the process of disease, must exist next to these ostensible causes.

Therapies reach from improved basic hygiene to antibiotics and disinfectant inserts into peri-implantal pockets up to ultrasonic treatments and laser curettage of inflamed tissues. The main attention, however, should not be placed on therapy, but rather onto an efficient prevention of peri-implantitis.

Reflecting on gaps and hollow spaces of assembled implants It’s a fact assembled implants contain hollow spaces, which can be minimised but not prevented even at the most meticulous production. Because also threads hold gaps, the contamination of implant interiors with germs originating from the oral cavity is inevitable (Fig 2).

The re-infection from an implant cannot be ruled out. On almost every assembled implant we noticed a putrid smell of its content, which was extracted with a cotton tip. In 1996 we initiated the examinations after that confirmed the assumption that gaps and hollow spaces in the interior implants were contaminated with germs, which matched the germ spectrum of an interdental smear. Implant interiors in their dimensions, position and size are easily recognised by construction drawings, cross-sectional shapes and X-rays, and so it becomes clear that hardly any assembled implant is actually excluded from those facts.

Of course, these considera-
tions apply to screwed superstructures as well. Cemented superstructures seem to be sealed at first by the fastening cement, but everyone knows the smell that emerges when cement is drilled from crown and bridge work and gives evidence of germs permeating here as well.

The access paths of germs into the implant interior are easily comprehensible, and we were able to provide evidence by taking light- and electron microscopic exposures of a used implant (Fig 5).

The paper of BINON et al. Implant Component Compatibility, confirms this matter quite impressively. The results showed that the macroscopically good fit revealed severe flaws under electron microscopic examination.

Furthermore, the capillary forces and micro motions between the implant and the abutment in addition promote the exchange of infectious material, wherein the saliva is a good vehicle. The saliva is a good vehicle.

The breeding conditions - warmth, humidity and supply - enable bacterial growth and fungal colonisation in an ideal manner, so that a re-infection of peri-implantal tissues via the outward leading gaps is given. Whatever treatment of this important area around the implant is applied, it will always remain short-lived.

Development and efficacy of Gap-Seal®

In order to counteract these re-infections we developed a material based on a highly viscous silicone matrix that seals the implant and protects it from bacterial or fungal penetration effectively.

Any antibiotic would not be sufficiently intensive and effective in such low doses, and would moreover contribute to sensitisation and the development of resistance. Afterwards we employed the so-called split-mouth technique to test the material against white Vaseline, and determined the required admixture of disinfectant.

The bactericidal and fungicidal properties and efficacy against viruses owes the sealing due to the principle: Where already something is, there nothing else can enter. If the medium does not offer a breeding ground, then nothing can grow.

The material met its purpose as gap and interior sealant more than satisfactorily and was subsequently named ‘Gap-Seal®’. (Fig 5). For the split-mouth studies GapSeal® was applied to the right sides of the implants, and Vaseline to the left sides. During this clinical comparability the Vaseline turned out to be thoroughly contaminated, while GapSeal® treated implants usually provided no evidence of germ growth. This is clearly proven by the follow-up examinations, which were conducted each six months afterwards.

The number of germs (CFU = colony forming unit) at each retaining implant was determined through serial dilution, followed by counting the CFUs on the incubation plates. This process enabled a definite determination of germs contained in each interior implant smear. We were able to prove the material's efficacy by conducting follow-up examinations between 1996 and 2000 and do not want to abstain from using GapSeal® ever since (Fig 6). These studies finally showed a statistically significant reduction in peri-implantitis by more than a third of implants sealed with Gap-Seal®.

Application

It provides an opportunity to seal implant interiors with Gap-Seal® immediately after inserting and removing the insertion tool thereby eliminating the prospective peri-implantitis inducing the re-infection factor.

For this purpose the carpus must be inserted into the applicator at first, and the closing cap needs to be removed. It is recommended to bend the cannula slightly around the applicator shaft according to the filling situation. Excess material gushing from the implant when the closure cap is screwed in indicates a good filling situation (Fig. 7).

The material will be delivered in sterile blister packs; the applicator is autoclavable to warrant sterility. In case the implant is treated with Gap-Seal® at a later point, a thorough cleansing of the interior spaces with alcohol is recommended. Furthermore it is advised to fill the hollow spaces of screwed superstructures with Gap-Seal® too. During implant re-entry at recalls it is advisable to renew old material, which may be rinsed out with xylol or Thol. Gap-Seal®s very stable, retains its qualities in case of cemented works over years, and requires neither exchange nor replenishment.

Results and discussion

Peri-implantitis is the most feared complication occurring in implantology, especially once the implant therapy with its appropriate prosthetics is completed. Suggestions regarding the treatment exist in ample variations and are put into practice as well.

However, it seems to be more reasonable to prevent the causes for peri-implantitis, which certainly originate to a large percentage from re-infection out of implant gaps and hollow spaces. The possibility of germ colonization on implant interiors exists and should be taken seriously. Attempts to combat re-infection are described in specialized literature since years.

Now GapSeal® with its 16 years of clinical experience offers a truly effective prevention against peri-implantitis.

About the author

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New product releases
Quicklase have released the new 3ke laser that is ideal as an introduction laser and priced at only £2,495; & cut delivery! The 3ke laser would be used for day to day dentistry for basic procedures such as staining for accurate impressions and gingival re-contouring for better fitting veneers and crowns, this is in addition to the standard procedures Gingivectomy, Gingiplasty and implant recovery. Also available a 4w and the model as an air fibre, which has an 8mm air fibre laser and priced at £1,695. The LaserTek lasers are also used for teeth whitening and TMJ; it’s a cost effective laser to come with everything you need from patients marketing to online training. Quicklase are the only British manufacture of lasers providing your local backup and support. This also means that they can offer the LaserTek lasers at very competitive prices, making them far more affordable laser assisted dentistry and in turn making your surgery more profitable. Quicklase have also released online training videos, hard files, guitar pechis, rotary files and paper point. Visit our website http://www.quicklase.com/product/endo/ or for more information on our endo products.

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