Are we addicted to success...? 
Do we always tell the truth?

Danger! Immediate implant placement in the aesthetic zone 
Is it time to stop using zirconia-based fixed reconstructions?
Is evidence-based medicine really effective?

Opinion: 
Massimo Simion asks if we should stop using micro-rough implants

Interview: 
Christer Dahlin reveals his ‘love at first sight’
Osseointegration: where we started from and where we are going

W

e have been using osseointegrated implants and bone regenerative techniques for almost 30 years. This article looks at where we started from and where we have got to – and perhaps most importantly explores where we are going.

Osseointegration has given us one of the most predictable treatments in dental medicine, characterised by success rates in excess of 95%. Until recently we had all got used to telling our patients: ‘Failures happen during the first few months and affect fewer than 5% of implants. If your implants are stable after a year, they will continue to function for the rest of your life.’ Late failures were an extremely rare event.

Unfortunately, the situation has since changed. More and more patients come to our practices with severe and progressive bone loss. Some researchers and clinicians predict a ‘tsunami’ of peri-implantitis that risks engulfing our patients in a very short period of time.

Studies involving ligature induced peri-implant disease demonstrated greater bone loss in implants with moderately rough surfaces, compared with those with machined surfaces. Moreover, the latter exhibited a complete resolution of the disease and no further bone loss after peri-implant ligature removal.

As a result, our confidence in implant treatment has decreased and we no longer feel confident telling our patients: ‘Your implants will function for the rest of your life.’ The reputation of implant treatment itself risks falling to pre-Brånemark era levels, when implantology and implantologists were considered to be the black sheep of dentistry.

When something is wrong, those who can take action have a responsibility to do so. Therefore, I believe the most respected researchers and clinicians – rather than the companies – will take collective responsibility for leading the way back to the traditional Brånemark concept of an implant with a machined surface, loaded only after a sufficient period of time for the bone to adapt to a foreign body, which rather than being called an implant is known as a ‘fixture.’ This will restore confidence and credibility to our work, and more importantly provide a long-term safe treatment option for our patients.

What did we change?

Let’s briefly go through the different periods of osseointegration:

1. From 1965 to 1980, Professor P-I Brånemark and his co-workers developed the concept of osseointegration, along with the famous Brånemark System.
2. From 1980 to approximately 2000, the Brånemark System was extensively and successfully used all around the world to treat thousands of totally and partially edentulous patients. A particular characteristic of the system was the use of the so-called ‘fixture’, a cylindrical implant with threads and a relatively smooth machined surface that was usually positioned using a two-stage surgical approach. Today, 75% of the articles in the literature still relate to this particular machined fixture and describe success rates above 95%, along with a prevalence of peri-implantitis of around 2.5% after 20 years of function.
3. From 2000 onwards, implant companies started producing so-called ‘active surfaces’. The implant surface was roughened by sand-blasting, etching, a combination of the two treatments, or anodic oxidation. The rationale was to promote faster and better osseointegration, thus allowing reduced healing periods before implant loading (or in some cases immediate loading). Despite the weakness of evidence of real clinical advantages, these new implant surfaces rapidly invaded the market in the early 2000s, generating a lot of consensus and enthusiasm among most clinicians.
4. Around 2005, the initial problems started coming to light. As had happened some years previously with HA coated implants, a small percentage of patients began to show peri-implant soft tissue inflammation and progressive bone loss. Unfortunately, year by year, the prevalence of peri-implantitis reported in the literature increased alarmingly to between 12% and 43%.

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References

At scientific meetings, speakers generally show us their outstanding clinical cases and report on successful techniques and materials. Even when they do mention complications (often using examples from other clinicians!) the cases generally end up with a successful clinical outcome. It’s the same in the scientific literature: most papers report favourable outcomes. It seems that in our field we’ve become addicted to sharing success.

There are many reasons for this: we are all proud of our best work and want to show it off. Sometimes there can be pressures from industry to avoid discussing complications. And as delegates and readers we have become accustomed to seeing beautiful cases. Nevertheless, as clinicians we all have to deal with complications and failures on a daily basis. Those complications may relate to clinical decisions, clinical implementation, or both. Faced with a world of perfection in the literature, we can sometimes end up feeling alone.

At Inspyred we believe failures and complications teach us more than the cases which proceed perfectly from start to finish. That why the theme of this issue is ‘What have you stopped doing in your daily clinical practice due to failures and complications?’

If you think you’re alone in facing problems relating to rough implant surfaces; immediate implant placement; fracture of internal zirconia abutments; chipping on zirconia-based fixed reconstruction; or soft tissue management, think again. Take a look at the articles by Massimo Simion, Stefan Fickl, Tommie Van de Velde, Henning Schliephake, Christian Ramel and Vincent Fehmer.

If you feel confused about evidence-based dentistry and whether your clinical decisions should be based solely on meta-analyses, we have good news for you too. You can improve your clinical decision-making by participating in Inspyred’s first interactive article, written by Martin Brient. This explores the clinical decision-making process and gives you the opportunity to analyse two clinical cases and compare your treatment approach with your colleagues.

You may have already noticed as you hold this edition in your hands that Inspyred now has double the number of pages! This means we have been able to include even more cutting-edge content, including an interview with Christer Dahlin and our Who’s who column by Jaime Jiménez García. Most importantly, Inspyred is about you, our readers, and what is relevant to you. Please email us with your feedback and suggestions, including proposals for articles for future editions.

Isabella Rocchietta and David Nisand

Submit an article to Inspyred

Inspyred welcomes articles from clinicians and researchers working in the field of implant dentistry, as well as those whose work brings a new perspective to the field. If you have an article you would like us to consider for publication, please email inspyred@eao.org.
GBR - was it love at first sight?
An interview with Christer Dahlin

You published one of the first articles on guided bone regeneration 25 years ago1. What was the atmosphere like at the time of the pioneers? It was really a very dynamic period. I was dividing my time between working at the Brånemark Clinic and conducting the first experimental studies on GBR. It was an era when in many ways Gothenburg was the global centre for implantology and periodontology and I was in the middle of it as a young PhD student. I saw the work going on behind the scenes: a lot of hard work. But we had incredible fun too. I’m also very grateful for the advice and standards set by my supervisor, Professor Anders Linde, who early on pushed me towards the international scene. I have been very fortunate to have (and still have) collaborations in many parts of the globe.

Is it true that the famous article was the result of an error? Was the finding an accident? Most of the discoveries that have changed our lives were in fact errors, but not in this case. I was participating in an advanced course in perio in my last year as a dental student and was listening to Professor Sture Nyman presenting his work on periodontal regeneration by GTR. I thought this was absolutely fascinating and a general principle that could be applied to other tissue types too. So I plucked up the courage to contact him and discuss this. He was very enthusiastic but also just moving to the US (Penn), so we formed a group together with him, Dr Jan Gottlow and Professor Anders Linde (basic science on mineralised tissue) and went to work. It was actually in many ways a hypothesis that was proven. I will never forget the evening when we received the first histological sections and saw the new bone formation underneath the membranes.

The production of ePTFE membrane has recently been stopped by Gore-Tex. What is the future for GBR? Do you think GBR will be restricted to resorbable membranes? In the short-term, no. I do believe we need a membrane for vertical ridge augmentation that can withstand the pressure from the surrounding tissues. At the moment a non-resorbable membrane is still the preferred choice. Gore’s membrane is sadly missed. However, the field of biomaterials and tissue engineering is moving rapidly forward and I would assume that we will see a biodegradable membrane with the right properties in the relatively near future.

One of the main problems with resorbable membranes is their ability to maintain space for bone regeneration. Can we replace the rigidity of the non-resorbable membrane with resorbable membranes or a bone substitute? I think the answer is that the standard of care today is always to use some kind of bone substitute material in combination with the membranes. Studies have shown synergistic effects (1+1=3).

In the future can we improve the space-maintenance effect of resorbable membranes without seeing the side-effect of non-resorbable membranes? Yes we can. We have the know-how today to create materials that we did not have in earlier years. Techniques such as electrospinning, as well as 3D printing on a micro scale have given us unique opportunities.

Are you currently working on a new generation of bone substitute? Can you tell us more about your research? Where will we be 10 years from now? I am. Very much so. We are studying various types of materials in order to optimise them in combination with membrane use. I cannot say much more right now. Otherwise someone might have to shoot me. Just kidding, but it is a little bit sensitive. In 10 years I expect us to have tailor-made bone substitute materials for local effects on the surrounding tissues. Maybe also active in treatment of pathological conditions.

Bone substitutes are mainly available in granules as the blocks often crack. Do you think it will be possible to get round this problem? Yes, absolutely so, with the novel techniques described previously it can certainly be done. However, the step to commercial products is not an easy one.

What has been your ‘love at first sight’? Apart from my wife? I’m still ‘in love’ with the biological principle of GBR. It’s fascinating to see the body heal itself and trying to understand precisely the mechanisms behind it. I will continue to do that. I don’t believe we have all the details of that puzzle yet. So as not to sound like a total workaholic, let’s skip work for a moment. I’m also very much an outdoors person and I have a long-term relationship (sometimes complicated) with the honourable game of golf. I try to keep some type of career going in that field but that’s sometimes a complicated relationship!

Below: Discussing the latest findings in GBR in front of the microscope with Associate Professor Anders Palmquist and research exchange student Annika Juhlin (USA).

Dr Christer Dahlin is a Professor in Oral Surgery and Guided Tissue Regeneration at the Department of Bionanomaterials Science, Institute for Clinical Sciences, The Sahlgrenska Academy, University of Gothenburg, Sweden. He is also a Senior Consultant in Oral & Maxillofacial Surgery and Chairman of the implant division at NÄL Medical Centre Hospital, Trollhättan. Dr Dahlin has over 25 years of experience in implant treatment, teaching and related research and is considered to be one of the pioneers of Guided Bone Regeneration which still remains his main research focus. He is currently project leader for the research group BIOMEMBRANE within the multi-disciplinary BIOMATCELL enterprise, a government-funded biomaterials initiative in Gothenburg, Sweden.

Immediate implant placement in the aesthetic zone

What I have changed in my everyday practice due to failures

Shortening of treatment time in implant dentistry is an attractive option for both the patient and the doctor. It is even more appealing if surgical morbidity, number of appointments and costs can be reduced at the same time. Unfortunately, taking a short cut does not necessarily mean that you can always expect to save time and effort. Immediate implant placement after a planned tooth extraction in the aesthetic zone is a case in point. It can range from a straight road to superb results, to a nightmare race against biology that you can’t win.

If you haven’t yet experienced buccal soft tissues melting away from the provisional crown you had installed on the implant you placed immediately into the central maxillary incisor socket – lucky you. I have had a couple of these moments when you can feel yourself slowly turning from a hero into a loser – and not only in the eyes of the patient.

One of the reasons why things can go seriously wrong is because what looks so easy is extremely complex. And if we are not in control of all the details, there are few places in the aesthetic zone to hide the results of misconceptions and faulty strategies. Many problems can be prevented by paying close attention to the correct vertical and horizontal positioning of the implant and the choice of the implant axis. Yes, we all know that the implant should be placed along the palatal wall of the socket, and that a buccal inclination can cost the patient some 0.5mm of gingival recession. It is also well understood that the implant head should be at or slightly under the level of the crest – which can be identified by probing. And finally, if the gap between the implant surface and the buccal socket wall exceeds 1.5–2mm, it might need grafting, not so much to regenerate the gap but more to maintain the buccal contour.

But even if I obey all these rules and do everything right, I can still select the wrong patient. As a result, we now focus much more carefully on case selection and evaluation before and during the extraction process, asking ourselves a number of questions:

- what kind of biotype is present at the planned site of implant placement?
- how thick is the buccal socket wall?
- is the patient a normal crest or a low crest type?
- is the socket wall intact?
- does the buccal contour of the socket stick out from the neighbouring teeth towards the lip?
- where is the smile line located?

Several factors can indicate a high risk of buccal bone resorption and untoward effects during soft tissue remodelling. These include:

- a thin buccal socket wall (<1mm; roughly two thirds of all cases)
- if soft tissues belong to the thin biotype (probe shines through the marginal gingiva during probing) with gingival height less than 2mm
- if there is a low crest and/or a damaged buccal socket wall

In these cases, we would clearly postpone the implant placement and use grafting material to fill the socket for ridge preservation. This will not completely prevent the post-extractional resorption, but will reduce horizontal shrinkage by roughly 60% and almost completely eliminate the vertical component of resorption. The grafting material may not become consolidated during the three to four months that we wait before we move on to implant placement. But even if we have to regraft defects after removal of non-consolidated grafting material, the contour of the skeletal envelope at the site of implant placement will be maintained well enough through the ridge preservation procedure to allow for soft tissue coverage of the augmented area without extensive releasing incisions or additional perioplastic surgery. In this way, decision-making in the treatment strategy in the aesthetic zone has become more relaxed and less adventurous when it comes to the timing of implant placement.

Henning Schliephake has been Professor of Oral & Maxillofacial Surgery at the Georg-August-Universität, Göttingen, Germany, since 2001. He was President of the German Society of Dental Oral and Craniofacial Sciences (DGZMK) from 2010–2013, and was elected to the EAO’s Board of Directors in 2010. He has been a member of the National Academy of Science since 2012. His research interests are reconstructive microsurgery, tissue engineering, growth factors, biomaterials, dental implants, and QoL in head and neck oncology.

Below, left and right: The figures show a case of implant placement after ridge preservation for 4 months in a compromised situation (periodontal disease, thin buccal soft tissue). Additional grafting at the time of implant placement had been necessary due to incomplete graft consolidation.
Improving our clinical decisions

Should we stop using evidence-based medicine?

Introduction

The treatment of a patient can be viewed as a succession of clinical decisions and actions. As clinicians, we have all made decisions which have led to complications or errors, and which we would change with the benefit of hindsight. Since the early nineties, clinical decision-making has mainly been studied through the prism of evidence-based medicine (EBM). The aim of this article is to assess whether EBM is the only way to improve our clinical decisions.

1. Implementing EBM

The aim of EBM is to ensure that clinical decision-making is based on a judicious use of evidence, taking into account both clinical expertise and the needs and wishes of patients. Contrary to popular belief, EBM is not based on a ‘cookbook’ approach where protocols are followed like recipes. EBM takes a broad view of the evidence and is not restricted to randomised controlled trials and meta-analyses. Rather than promoting practice that is ‘tyrannised’ by evidence, its aim is to ensure that decision-making in healthcare incorporates the best available evidence. Patients expect clinicians to use a large amount of up-to-date scientific data to consider the ‘best’ therapeutic option. But as clinicians we are aware that despite more than 25 years of EBM, there are many variations in how the best available evidence is implemented into clinical practice.

Two examples of clinical factors where evidence is not currently put into practice consistently are the roughness of the implant surface and the prosthetic retention mode. Both of these are risk factors for peri-implantitis. However, to achieve faster osseointegration, about 99% of implants currently placed have a rough surface, even though scientific evidence relating to the long-term risk/benefit of rough surfaces has not been clearly established. This suggests a questionable over-implementation of the (limited) available data. On the other hand, there is currently an increasing body of evidence that cement excess is one of the major co-factors leading to peri-implantitis. Despite this, according to many dental lab technicians and one of the main companies involved, it seems that – in France at least – cemented prostheses represent the majority of implant-supported dental restorations, suggesting a disturbing under-implementation of the data.

A number of factors have been proposed to explain these variations, including habit; industrial propaganda; academic influence; lack of critical thinking; and a lack of safety culture. But, according to Louise Bate et al., these gaps are mainly the result of multiple individual decisions. Even if decision-making remains an uncertain enterprise, a better knowledge of the processes involved could lead to a greater number of better decisions.


It is a common belief that the human brain is capable of processing a lot of potentially relevant information in order to reach decisions that are as good as possible, suggesting computational thinking behaviour. However, the political scientist and psychologist Herbert Simon states that, faced with the complexity of our environment and as a trait of evolution, our brains truncate large volumes of information to make decisions that are ‘good enough’[1]. Simon calls this ‘satisficing’, based on the idea that the ‘cost’ of ongoing research cannot justify the expected benefit. This theory is relevant to how we process scientific data. Allen & Harkins illustrated that a clinician who referred to the relevant guidelines provided by major scientific societies would need to spend 122 hours reading 3,679 pages of information in order to manage 18 patients admitted in a 24 hour on-call period. This is clearly not realistic and we have to admit that the majority of our decisions are made with a satisficing approach.

3. Dual process theory: Daniel Kahneman, 2002 Nobel Prize in economic sciences

Study of the decision-making process by the psychologist Daniel Kahneman led him to establish the concept of dual process theory[2]. He states that humans can make decisions in two different ways: a fast one, named system 1, which is essentially intuitive, automatic and effortless; and a slow one, system 2, which is rational, analytic and time-consuming. Neither of these two systems can be seen as ‘good’ or ‘bad’. Both are necessary in our daily practice because they have opposite qualities. Studies have shown that on average in general medical an inquiry is needed before treating one in three patients, but clinicians only search for an answer once a week on average[3].

4. FORDEC: a decision-making tool

According to Croskerry[4] and Bate et al., gaps between evidence and practice can occur when a clinician develops a pattern of knowledge which they then rely on to make system 1 decisions, without the activation of a system 2 check. Medicine is not the only field where a system 2 check is needed. The development of human factors science in the aircraft industry has led to the development of different decision-making tools, including FORDEC (Facts, Options, Risks, Decision, Execution, Check). Franck

Get involved!

Once you have read this article, why not email Inspyred with details of the treatment options you would choose for these cases? We will publish your treatment recommendation on the Inspyred website so you can compare your choices with your peers. Email your proposal to: inspyred@eao.org.

We will also let you know when the actual treatment protocols are available to view on the website!
Laigneau, former dental surgeon and currently a pilot on long-haul flights, states that this tool is intended for non-emergency situations, in which listing the different options and working through the risk evaluations tend to allow a system 2 check.

5. Is a tool like FORDEC effective in dental practice decision-making?

At the 2012 French Dental Association (ADF) congress, Serge Armand (president) and Franck Renouard (member of the scientific committee) developed a ‘serious game’ session dedicated to clinical decision-making and treatment planning. A multidisciplinary team made up of Sandrine Dahan, Christine Muller, Florent Trévelo, David Nisand and Martin Brient conducted the session under the scientific responsibility of Jean-Pierre Attal. They presented a complex case to a group of 719 clinicians at the congress (Figures 1–4). This concerned a 28 year old patient with a lower right first molar (nº46) and second premolar (nº45) with resorbed roots as a result of a supernumerary retained tooth (nº45’). Table 1 shows the demographics of the audience. The following scenario was described to them:

The patient comes to the dental clinic for a check-up. He is in good health and isn’t experiencing any static or dynamic occlusion problems. He doesn’t have any other supernumerary teeth.

First, the participants had to make a diagnosis. Secondly, they were asked to make a clinical decision about the treatment required, responding to an open-ended question. Thirdly, they carried out a FORDEC decision-making process. Next, the different treatment options were listed and a risk assessment was performed for each one. Finally, the 719 participants could reselect a therapeutic option.

At the end of the session, 63% of the audience reported having changed their mind and chosen a different option from the one they had selected initially. To illustrate this, Table 2 shows the answers to the question ‘Which tooth or teeth do you plan to extract?’ before and after the FORDEC process. At the end of the session, the actual decisions made by the team treating the patient were presented to the audience.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Female</th>
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<tr>
<td>Male</td>
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<tr>
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<td>30–40 years</td>
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<td></td>
<td>40–50 years</td>
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<td></td>
<td>50–60 years</td>
<td>27.1%</td>
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<td></td>
<td>60–70 years</td>
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<td></td>
<td>Over 70 years</td>
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<tr>
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<td></td>
<td>Less than 100,000</td>
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<table>
<thead>
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<th>Kind of practice</th>
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<tbody>
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<td>Specialist</td>
<td>7%</td>
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<table>
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<tr>
<th>Which tooth or teeth do you plan to extract?</th>
<th>Before FORDEC</th>
<th>After FORDEC</th>
</tr>
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<tbody>
<tr>
<td>45</td>
<td>7.5%</td>
<td>0%</td>
</tr>
<tr>
<td>46</td>
<td>47.7%</td>
<td>66.7%</td>
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<tr>
<td>45 + 46 + 45’</td>
<td>2.1%</td>
<td>5.8%</td>
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Now it’s your turn!

If this was your patient, what would your clinical decision be? Which treatment option would you propose to him? Read on to be inspired by the clinical decisions of Professor Alberto Sicilia. Afterwards, why not email us your own proposed treatment option for publication on the Inspyred website?

**Professor Alberto Sicilia’s proposed treatment protocol:**

We don’t have any medical or periodontal information on the patient. However, based on his age and the absence of loss of attachment of neighbouring teeth, we will assume that he is in good medical and periodontal health.

It seems that tooth 45 has a deep localised loss of attachment and also deep root resorption affecting two thirds of the distal side of the root, and its prognosis is hopeless. On the other hand, tooth 46 seems to have resorption limited mostly to the crown, and, according to the 3D reconstruction, there could be suprabony healthy root, at least in the buccal side, and also a very mild mesial loss of attachment and no furcation involvement. Finally, tooth 45’ is healthy and partially erupted in the lingual side and, hence, at this level, soft tissues could be inadequate.

If the patient would accept orthodontic treatment, I would propose a very conservative 45 extraction, exploring the mesial root of tooth 46 under anaesthesia. If the situation as described above was confirmed, I would recommend endodontic treatment and reconstruction of the first molar, as well as orthodontic repositioning of 45’ into the 45 position. Depending on the mucogingival situation on the lingual side, a connective tissue graft could be required. Taking this approach, we would end up with a very conservative result comprising a healthy repositioned ‘new’ 45 tooth, with a good prognosis, and a 46 that had been endodontically treated and reconstructed. If in the following years the patient suffered a non-treatable complication of this particular tooth, it could be easily replaced by a dental implant.

6. Risk assessment

When FORDEC is used in daily clinical practice, it appears that the risk assessment element is the key stage in the decision-making process. Two different kinds of risk can be described. ‘External’ risks relate to therapeutic options, and include biological cost; reversibility; prognosis; and complication rates and consequences as evaluated from the literature. ‘Internal’ risks relate to the capacity of the clinician to achieve the result he/she intends, including how their skill will influence the result. These include surgical skills (i.e. competence) and how the situation allows these skills to be used (i.e. situational awareness and performance). The following clinical situation (Figures 5–9) will help illustrate the difference between the two types of risks:

A 29-year-old man is seen the day after a dental trauma he experienced during a Tae Kwon Do training session. He had visited the dental emergency service at a public hospital less than two hours after the trauma and the on-call clinician had diagnosed a complicated crown-root fracture (pulp involved) of the upper left central incisor (n°21) and an enamel-dentin fracture to the upper-right central incisor (n°11). As the coronal fragment of tooth n°11 had been preserved, the on-call clinician had bonded it to the tooth. The fragment of tooth n°21 was still maintained by the palatal periodontal ligament. It had also been bonded but could be easily removed at the beginning of the examination. The palatal level of the remaining root is very close to the bone level.
Imagine that this patient is in your dental chair and you are the only clinician in the room. Taking into account internal and external risks, what decisions would you make and what actions would you take? Bear in mind that you have to manage the short-term treatment on your own, but that you can work with a multidisciplinary team for the long-term treatment planning. Read on to be inspired by the clinical decisions of Dr Tommie Van de Velde.

Dr Tommie Van de Velde’s proposed treatment protocol:

During the first (emergency) visit I would like to gather some additional information: careful inspection of the root of 21; mobility of 21–11; pain score for 21–11; and occlusal function. If a fracture of the remaining part of tooth 21 was suspected following these diagnostic evaluations, the prognosis would drop to poor and the tooth should be scheduled for extraction. It should also be explained to the patient that if a fracture was diagnosed during the follow-up, the implication would be extraction, and consequently placement of an implant. During the same visit, endodontic treatment of tooth 21 should be started with the placement of a CaOH dressing under isolation with rubber dam. The remaining tooth fragment could be bonded as a temporary restoration.

If the follow-up of tooth 21 revealed no signs of additional problems, there would be a choice of either crown-lengthening or orthodontically extruding it for definitive restoration. I would base this decision on how deep the fracture was located interdentally. If the fracture line was only located on the palatal side, a localised crown lengthening procedure would be indicated. If the fracture line was located subgingivally in the interdental area, crown lengthening would have aesthetic consequences for the interdental papillae and orthodontic extrusion would then be indicated.

When all remaining tooth structure was above gingival level, both incisors would be scheduled for composite reconstruction based on a wax-up. The buccal part of 21 (and 11 if needed) could be restored with a ceramic veneer to achieve the desired aesthetic appearance.

If an implant was indicated, the timing of its placement should be based on patient expectations. We see a rather thin biotype with equal to receded gingival levels (swelling one day after trauma?). If the aesthetic expectations were very high and the smile line showed part of the gingival tissues, a delayed approach could be indicated to overcorrect the peri-implant soft tissues after tooth extraction. A connective tissue graft and the use of a slowly resorbable biomaterial would be indicated to preserve hard and soft tissues (either at the time of extraction or during immediate implant placement).

7. Conclusion

So should we stop using EBM to improve our clinical decisions? Of course not. One reason stated by Eileen Gambrill is that EBM helps us to honour ethical obligations by moving away from authoritarian practices. But we have to go further. Imagine a type of EBM in which the balance between the scientific data, the clinician’s expertise and the patient’s needs and wishes was better. Imagine a decision-making process where the clinician not only considered the complication rate but took into account the external risks, leading to a combined assessment of the complication rate and its consequences. Imagine a decision-making process that allowed the clinician to weight up these external risks in terms of his own performance. Finally, imagine a mode of practice that led to patients having greater knowledge, more accurate perception of risks and lower decisional conflict because they were part of a shared decision-making process. Well, we have some good news for you: this practice exists. It’s called evidence informed practice (EIP). And yes, you’re right, it’s EBM as it was originally described and as it should always have been.

8. Acknowledgements

ADF Congress 2012 – Serious Game Session: Professor Serge Armand, Dr Franck Renouard, Dr Jean-Pierre Attal, Dr Guillaume Reys and Dr Florent Trévelo.

Clinical case n°1 (serious game session):

- Dr Sandrine Dahan (endodontic follow-up)
- Dr Christine Muller (orthodontic treatment)
- Dr David Nisand (surgical treatment and periodontal follow-up)
- Mr Jean-Marc Etienne (laboratory work)

Clinical case n°2:

- Dr Hélène Fron (on-call clinician)
- Dr François Bronnec (endodontic treatment)
- Dr David Nisand (periodontal follow-up)

9. References


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View the real treatment options!

After you have read this article, we hope you will participate in the debate by emailing your own proposed treatment options to inspyred@eao.org. Later in the summer, we will post the actual treatment options on the website! We will email you when this is available.
Over the last decade there has been an increasing interest in periodontal plastic surgery as an adjunct to implant surgery. This is because the harmonious integration of a tooth or implant does not depend solely on hard tissue support, but also on the soft tissue architecture. For soft tissue surgery to be successful, flaps and underlying grafts must receive adequate blood supply and nutrition. In recent years, developments have focused on minimally invasive and microsurgical techniques. These are pertinent because complications following soft tissue surgery are often difficult to correct due to scarring and pronounced tissue loss. The aim of this case report is to illustrate a classic technique for root coverage, along with its limitations.

Historically, gingival recessions were either covered using free gingival grafts or sophisticated flap techniques (lateral repositioned flaps, double pedicle flaps, or multiple pedicle flaps). The latter required multiple papilla incisions and releasing incisions in order to mobilise flaps to cover denuded root surfaces. Free gingival grafts became unacceptable due to a lack of colour match and their failure to completely cover roots. In the case of sophisticated flap techniques, it became obvious that every incision and releasing incision was associated with tissue trauma and might hamper the overall outcome. Although this might be acceptable around single type gingival recessions, flap techniques also evolved to cover multiple gingival recessions. Today, undermining techniques are used whenever possible. These involve elevating the marginal mucosa through the sulci of the affected teeth, a process that leads to predictable root coverage without scarring, and limited tissue relapse. The case that is illustrated here shows the limitations of a technique using multiple pedicle flaps.

Figure 1 depicts a clinical situation with multiple gingival recessions following periodontal therapy. To cover the recessions with attached keratinised tissue, one double pedicle flap (regio 22) and two lateral sliding flaps (regio 23, 24) were prepared (Figure 2). The flaps were elevated as partial thickness flaps and the double pedicle flaps sutured together (Fig. 3). A subepithelial connective tissue graft was harvested and sutured over the denuded root surfaces using sling sutures (Figure 4). Sling sutures were also used to fix the flaps over the connective tissue graft and denuded root surfaces (Figure 5). Healing presented uneventfully after 7 and 14 days (Figures 6 and 7), although bulky tissue and scarring tissue was already visible. The result after four months displayed an inharmonious gingival outline without complete root coverage (Figure 8). Four years after the therapy, scars and inharmonious tissue levels were still visible (Figure 9).

Conclusion

Classical flap techniques to cover gingival recessions can achieve root coverage, but often fail to achieve complete coverage and are often associated with unacceptable aesthetic outcomes. Today, tunnelling techniques are preferred in these cases.

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Fracture of internal zirconia abutment connections

A 39-year-old female patient presented seeking an implant-supported restoration to replace her right maxillary central incisor, which had been extracted ten years earlier. Although the healed bone was adequate for implant placement, the horizontal soft tissue was deficient (Figure 1). The treatment plan called for the placement of an implant and a simultaneous tissue graft. A coded healing abutment of the type used for impression taking would be placed initially, followed by a zirconia abutment. The patient provided informed consent and treatment commenced.

A 4mm diameter x 3.4mm platform x 13mm long implant (T3 Tapered Implant, Biomet 3i, Palm Beach, USA) was placed into the healed extraction site (Figure 2). A minimal flap was reflected and a connective tissue graft – harvested from the palate – was placed on the facial aspect of the edentulous site (Figure 3).

An impression of the freshly installed implant was made and a definitive abutment was designed to install early during maturation of the soft tissues (Figure 4). The ideal outline of the abutment and the biocompatible material acted as a scaffold for the soft tissues to heal around. A provisional crown (Figure 5) was cemented to further guide soft tissue architecture before a definitive crown was fitted. Additional soft tissue corrections were performed to increase the soft tissue aesthetics. A final impression was made using an individualised impression coping that matched a duplicate of the zirconia abutment (Figure 6).

Figure 7 shows the final result with definitive crowns on the implant and neighbouring central incisor. Note the excellent soft tissue volume at the buccal side of the implant.

After five months the patient presented to the office complaining about pain in the cervical area of the implant restoration. There were no clinical or radiological signs of inflammation. At a second visit the crown was unscrewed and fractures of the zirconia abutment connection were observed (Figure 9). A temporary crown was provided and impressions were taken so a new zirconia abutment and crown could be constructed. The decision was made to fabricate an anatomically designed zirconia abutment with layered ceramics on the facial aspect. The crown was screw-retained on a titanium interface which was glued into the abutment during one of the final stages of preparation at the dental lab (Figures 10 and 11).

Literature

In implant dentistry, there is often a tendency to set ambitious aesthetic goals when restoring lost dentition, including attempting to correct previous aesthetic deficiencies. With this in mind, numerous techniques have been described to preserve or augment peri-implant tissues. In addition, the design and material characteristics of implant components have been adapted to fulfill the advanced aesthetic requirements of implant restorations.

Customised zirconia abutments can create a more aesthetic transition between the integrated implant and the restoration. In clinical settings, zirconia abutments have been demonstrated to have similar survival rates to titanium abutments, even for posterior restorations. However, the internal connection between a full zirconia abutment and the implant continues to be a mechanical challenge. This is particularly the case for abutments where a zirconia component engages with the internal connection of an implant, where fractures seem to be more likely. The material characteristics of zirconia might not be suitable for an internal tapered connection.

To prevent the zirconia from fracturing at the connection, the use of a titanium connection in bi-component aesthetic abutments has been suggested. An in-vitro study looked at the effect different types of implant-abutment connections had on the fracture load of zirconia abutments. It concluded that the type of connection significantly influences the strength of zirconia abutments. Superior strength was achieved by means of internal connection established via a secondary metallic component.

Dr Tommie Van de Velde

Tommie Van de Velde graduated in 2001 from the University of Ghent, Belgium. He then undertook a 3 year full-time Master in Periodontology and fixed Prosthodontics at the same university. In 2009, he was granted the PhD title with the subject: ‘Innovative protocols in implant dentistry’. From 2004–2012 he worked as Assistant Professor at the department of Periodontology and Oral Implantology at the University of Ghent. He owns a multidisciplinary office in the city of Antwerp and practices exclusively in the fields of periodontology, implantology and aesthetic oral reconstruction.

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Zirconia-based fixed reconstructions: Extensive chipping in an all-ceramic full-mouth rehabilitation case

Fifteen years ago, after decades of unchallenged dominance in fixed reconstructions on both teeth and implants, porcelain fused to metal (PFM) crowns got a new competitor: all-ceramic reconstructions. New indications for all-ceramic fixed dental prostheses arose, particularly with the introduction of zirconia as a framework material. Their advantages are as follows:

- since the core of the reconstruction is white or tooth-coloured, it is easier for dental technicians to achieve an artificial tooth with a natural appearance.
- rising prices for precious metals have led to higher costs for traditional PFM reconstructions. Metal-free fixed dental prostheses (FDP) therefore have the potential to reduce costs.
- zirconia is known to be highly biocompatible and hypoallergenic.

On the other hand, chipping of the veneering porcelain on all-ceramic reconstructions is observed more often compared with traditional PFM reconstructions. Metal-free fixed dental prostheses (FDP) therefore have the potential to reduce costs.

A 60-year-old female patient presented at the clinic wishing to substantially improve the function and aesthetics of her dentition. She had been neglecting her teeth for many years. Despite maintaining good oral hygiene, decades of high occlusal activity, along with gaps resulting from tooth loss, had decreased her vertical dimension dramatically, leaving pronounced areas of abrasion. In centric occlusion, some teeth even touched the opposite gingiva with their cusps. She was highly allergic to a number of materials, so wanted as little metal in her mouth as possible.

The treatment plan involved increasing the vertical dimension and re-establishing occlusion and function by means of all-ceramic implant and tooth borne reconstructions. This took place in five stages:

- a pretreatment phase combining patient information with instructions on oral and dental hygiene.
- replacing the missing teeth by means of implants, with the assistance of guided bone regeneration wherever needed.
- raising the vertical dimension by inserting fixed provisional on implants and the existing teeth in the bucal segment.
- rebuilding the anterior teeth with direct composite fillings and aligning them by orthodontic means to close the gaps.
- fitting of the definitive zirconia-based all-ceramic reconstruction.

The resulting treatment strategy was to:

- replace the all-ceramic reconstruction with a porcelain-fused-to-metal FDP.
- carefully adjust the occlusal and functional contacts to guarantee a canine guidance for laterotrusion, as well as encouraging the patient to wear her Michigan splint as often as possible.

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Figure 15 demonstrates the harmonious appearance of the dentition following an increase of the vertical dimension by about 5mm in the anterior segment; orthodontic pre-treatment in the upper anterior area; and fitting of a metal free zirconia-ceramic reconstruction. However, a few days after the reconstruction had been fitted, the patient came back with a little box filled with veneering porcelain chips (Figure 16). These mostly originated from the FDP in the upper right jaw and the most distal crown in the lower right jaw, which opposed the upper reconstruction. All of the chips were made of veneering ceramic. A thorough examination revealed that the buccal cusps were chipped off. The borderline and presumably the beginning of the crack formation seemed to be exactly at the occlusal contact area. After marking the occlusal contact areas, it seemed that the start of the cracks was located exactly at these locations (Figures 17/18).

Detailed discussion of the case by the team yielded the following possible reasons for this failure:

- the increase in vertical dimension is likely to have led to even higher occlusal forces in a patient who already had extraordinarily high occlusal forces.
- during the design stage and following delivery of the reconstruction, insufficient attention was paid to the adjustment of the occlusion and functional contacts.
- the two opposing reconstructions were almost entirely implant-borne. It is well known that implants show about a tenth of the mobility compared with a natural tooth, and have much lower tactile perception, both of which are likely to increase the occlusal forces.
- even though there have been numerous technical improvements to zirconia-based reconstructions in recent years, chipping of zirconia veneering ceramic is observed more often than with traditional PFM veneering ceramic.
- the patient was supplied with a Michigan splint to protect the reconstruction, but unfortunately did not wear it on a regular basis.

The treatment plan involved increasing the vertical dimension and re-establishing occlusion and function by means of all-ceramic implant and tooth borne reconstructions. This took place in five stages:

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- raising the vertical dimension by inserting fixed provisional on implants and the existing teeth in the bucal segment.
- rebuilding the anterior teeth with direct composite fillings and aligning them by orthodontic means to close the gaps.
- fitting of the definitive zirconia-based all-ceramic reconstruction.

What we learned from this case:

- patients with a history of high occlusal forces are at higher risk of chipping veneering ceramics, particularly after the vertical dimension has been raised.
- veneered zirconia-based FDPs should be avoided in high-risk cases like the one described above.
- implant-borne reconstructions tend to chip more easily than tooth-borne FDPs.
- occlusal design and adjustment is crucial for a success outcome.
SEPTEMBER 25–27, 2014
SPQR: SIMPLIFICATION, PREDICTABILITY, QUALITY TO ACHIEVE RESULTS
The EAO congress
Some facts and figures behind the event

The EAO’s annual scientific meeting is one of the biggest events in the annual dental calendar, attracting around 2,500 delegates, along with many of the world’s top clinicians and researchers. But the congress hasn’t always been such a big event. In the EAO’s early days the meetings were small-scale and had to compete with well-established meetings run by other associations.

The congress takes place in some of the world’s most stunning cities, visiting a different country in Europe each year. In 2014 it comes to Rome for the first time, marking a historic opportunity to combine a world-class scientific meeting with a visit to this incredible city.

In addition to welcoming thousands of delegates, the congress attracts well over 1,000 industry representatives, who come to take part in the exhibition. Around 90 different companies are represented, providing an opportunity for delegates to see the latest technological developments in their field first-hand.

Organising an event on this scale is a giant task, and preparations begin two years beforehand. The EAO’s professional conference partner, Colloquium, coordinates activities from its headquarters in Paris. The first stage is to identify and book a suitable venue – not an easy task when organising such a large event. They then take control of all practical aspects of the meeting, arranging travel for the invited faculty, organising catering, agreeing industry sponsorship, and identifying a historic location for the EAO members’ dinner. A huge amount of work and resources goes into this process. Simultaneously, the EAO’s Scientific Committee, Congress Committee and Abstract Committee develop the scientific programme, invite the faculty of speakers, and assess the abstracts that are submitted for inclusion. As the opening day approaches, the scientific and practical elements come together to deliver a world-class event involving thousands of people from all over the globe.

If you have not yet participated in an EAO congress, 2014 is the perfect year to do so. Don’t miss the opportunity to take part in this vibrant, exciting and clinically practical event, which continues to evolve and develop each year. Book your place online now at www.eao-congress.com.

More than 180,000 air miles to transport the faculty of speakers to and from the event

€1.9m of hotel reservations

1 scooter used by stage manager Guillaume Roux to get around the site

250,000 emails sent out in the run-up to the event

1,500 litres of coffee consumed during the coffee breaks

3 km of fibre optic cables

16 tonnes of video equipment

16 onsite staff
Who’s who

Jaime Jiménez García interviews some figures from the world of implant dentistry

Professor Dennis Tarnow. The main focus of my clinical research now is to try to minimise the changes with immediate extraction sockets. By doing minimally invasive surgery and proper restorative treatment at the time of extraction we are finding that we can prevent the ridge from going through the classic resorption that everyone has seen. Most of the resorption that researchers documented in the past was due to opening flaps for extractions that disrupted the blood supply to the buccal or facial plate of bone. On the basic science research side, my research is now on cementogenesis on implants and/or abutments. With our excellent team at Columbia University, we are working on putting cementum on an implant so that if placed properly, it could potentially be used in growing teenagers who are congenitally missing teeth and are still going through their growth and development. It would therefore not be ankylosed and be able to grow with the child. We can also use this same process on abutments so that we may be able to keep tissue truly attached to abutments after placement. This would help with keeping mid-facial recession from occurring, and most importantly may be able to be used to solve the black triangle problem due to loss of the inter-implant papilla. It would be able to give us back supra-crestal biologic width that adjacent natural teeth have.

Professor Istvan Urban. My primary focus over the last 15 years has been to reach a predictable level in the regeneration of ridge defects and to achieve good long-term treatment outcomes. We have also focused on minimising the morbidity of the procedures and the discomfort experienced by patients. Complication rates for vertical ridge augmentation have reduced to around 3% (they were 4–5 times higher 15 years ago). I think this is a big achievement. At the same time, I strongly believe that developing easier procedures is important in reducing risks. This was the idea behind our recent work on horizontal ridge defects, which led to the development of the so-called ‘sausage’ technique, which utilises immobilised collagen membranes. We are not using 100% autogenous bone in our grafts anymore, but particulated composite grafts, minimising the morbidity. Lastly, we are placing a strong emphasis on minimally invasive soft tissue reconstructive procedures related to ridge augmentations. We are finishing an exciting study looking at vestibular extension and keratinised tissue gain using a combination of autogenous ‘mini’ grafts in combination with soft tissue matrixes. We are also investigating the role of the periosteum in growth factor induced bone formation. My primary goal is to be part of a team of colleagues focusing on the development of the ‘perfect’ bone graft.

Dr Pablo Ramirez. As a young dentist, my main objective is to combine a comprehensive education in both implants and prosthetic dentistry: I believe both specialties have to walk hand in hand. We all know that dentistry is moving fast and we need to know about many factors including materials, techniques and technology to give our patients the best treatment. I finished my degree in dentistry at the Universidad Europea de Madrid (UEM) in 2003. I work at our family practice, which has been based in the Canary Islands since 1932 (three generations). I consider myself to be very lucky since I was able to absorb a lot of dentistry and knowledge from my very first steps. This really gave me the energy to become a better dentist, and also to develop a strong empathy with my patients. Right after my graduation, I started my postgraduate in implants and oral rehabilitation at UEM. At the time our family practice was mainly focused on orthodontics, so adding implants and prostho gave us an extra punch to improve our cases and finish them in a more complete multidisciplinary approach. After this first year I was fortunate enough to be able to complete my academic training at NYU. I spent three years focused in prosthetics, perio and implant dentistry. Dentistry is my passion, my life. I believe that learning never stops, and this is particularly true in dentistry.

The next issue of Inspyred will introduce a new regular feature where readers can share photographs and descriptions of their implant failures (you have the choice of being anonymous, if you prefer). Called ‘wiki-implants’, the column will enable you to learn from the problems your colleagues have experienced, but which they may have been unwilling to share previously. A ‘wiki’ is a website or database developed collaboratively by a community of users. Inspyred aims to create a space where clinicians can talk honestly about the problems they have experienced, so that others can learn how to avoid similar problems and complications in the future. If you would like to contribute to this column, please email details to inspyred@eao.org.

The views expressed in the articles published in this magazine are those of the author(s) and do not necessarily represent EAO’s position on these issues. EAO cannot be held liable for any statements expressed therein.