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In Memoriam – Paul Rotsaert (1958-2014)

Call for Papers / Demande de communications
Looking back over the last 25 years of my medical systems career, the electronics, optics and design improvements are incredible. From a systems engineering point of view, it is getting easier to predict opportunities and then develop things on a smaller budget, including engaging clinicians, ‘payors’ and patients in a development cycle. Many components that required millions of dollars to develop in 1990, can now be purchased as modules, often for less than hundreds of dollars. In that context, I thought I’d discuss the background to some coming technologies.

Consider some present technology focus areas: business intelligence; financial modeling; communications; data analytics; and data mining. You might ask what these have in common with the near future of clinical practice. Given how many of us are using smart phones, and the tech industry focus on that platform, then progress in other professions will help define the key issues related to health platforms. The medical space is a tough place to be because its innovation is slow to evolve, but there are similarities in all businesses.

Analytics got its big start in the financial world looking at big data. At the beginning of the last century, Bachelier applied mathematical principles to financial models using concepts including Gauss’ laws and Brownian motion¹. As a new concept it was subject to controversy. Fast forward to the 1970s and those old concepts were the foundation for economists who went on to win the Nobel prize. When a development platform capability catches up to concepts, things can happen quickly. Some of the mathematical techniques used in performance and risk analysis are also relevant to health care. Similar concepts to patterns in big data will be applied to the single
patient. I would argue that without those steps taken to analyse big data for the big players, we would not be discussing how to implement complex analysis on a per patient basis. We will be seeing more technology in clinical practice using analytics that are outside of a routine workflow; or computational ability. These include pattern analysis routines for marketing, imaging, patient analytics and so on.

2D–3D–4D imaging are upon us. Through these we will get better data and make more relevant interpretations in real time. That critical aspect, interpretation, has not become part of the landscape; many doctors are still putting processed films on lightboxes. That is analogous to why products that use fluorescence detection are not really making the impact they could. It can be hard to interpret tissue changes if you are not an expert, even if you are using great tools. But all that is going to change.

Back in the late '90s I worked in a pathology lab where I built a spectrophotometer assessing various types of human tissue. While trying to characterize results, I realized that patterns in data were more important on a per patient basis than the actual spectral data at any given point; in this case, the ratio of water, hemoglobin, oxygen and fluorescence and other optical characteristics. The levels are all slightly different for every type of tissue, and for every person, yet there are patterns. If pattern analysis is implemented properly, then the sensitivity to characterize dysplastic vs. inflamed tissue will be increased far beyond systems used for visual analysis of skin lesions. There will be an argument against a computer analysis as not being proven or reliable, but one could equally argue that a clinician using optical visualization is also very subjective, and probably very late. When automated Pap smear analysis technology began in the late 1990s with the AutoPap there was much criticism and it took many years to become accepted. With any type of digital imaging enhancement, the signal to noise characterization [sensitivity] is far in excess of anything the eye could see, thus further enabling earlier diagnostics. The question is: how will those technologies fit into a diagnostic workflow?

I first started using digital cameras in 1989. This is one sector showing remarkable change. In 2000, I was building spectrophotometers that cost $500,000. By 2007, some of that critical capability was achieved with a $300 digital camera. Suddenly the hardware was not relevant and the focus turned to how to extract data from low cost hardware with extraordinary software. We did a small clinical trial of skin fluorescence lesion data from digital cameras and found that there was enough information captured to use this as a platform, even without any filters. Physicians used this inexpensive technology to create relevant output. That is a very different approach from direct fluorescence visualization, which is more like the old school Woods Lamp that some dermatology clinics are still using.

Nevertheless there were a few problems with the clinical use of digital cameras. The first and biggest being that nobody would adhere to a routine of image capture, then at the end of a day, label and send an email to the lab for us to process the image. Also, importantly, the patient was long gone by that time, so the opportunity to engage the clinical workflow was lost. In the end, if the doctor thought there was something suspicious, based on ABCD rules, [Asymmetry, Border, Color, Diameter] as first described by Friedman et al, then there would be some very specific responses: excise, biopsy and/or refer, and usually before imaging results were ready. To impact the clinical workflow, earlier intervention and real time ‘scan to interpretation’ are both required. Furthermore, there must be little cost to the clinician, and ideally a profit without a big cash outlay.

If technology can provide an interpretation that might flag anything suspicious, can it improve the intuition of the clinician in a fast paced workflow? The use of a camera without a means to provide results and manage data seemed improbable. Further the ABCD rules of dermatology require a time series. Enter the smartphone, the ultimate platform/modules for what is needed to connect the dots. Alpha trials of smartphone camera software can take images of any skin lesion and compare a separate image in a time series, and then rectify [correct] and register [compare] the images.

Some of my interests include: patient analytics for interactive medical health questionnaires; characterizing patient needs and concerns to define appropriate clinical services, essentially direct marketing based on needs that a patient defines; and assessing probabilities. Another interest is communications and informatics where so much happening in every aspect of society. I asked Ted DeVries of Exan, a dental business leader, his thoughts on that, he said:

“Personally, I believe that technology in health care will go like all other industries. Our patients’ demands for technology in their healthcare will be no different than they are in all other aspects of their life. They will want to have all of the health care information, when they want it, where they want, whether that is on a computer, in the comfort of their own home or on their mobile device. Their demands for information will not slow down but rather increase consistently over time. In that not so distant future, patients will not accept that they have to wait for information and the lack of information will be a reflection of an office ‘not with the times.’ Patients will evaluate providers of care by their ability to be ‘current’ as a direct correlation to their expertise in the health care field. People will start to evaluate the competency of their health care provider by his/her acceptance and implementation of technology. If a provider of care is behind in technology there will be an assumption that they are also behind in current health care practices.”

The smart phone is the right platform for the coming collaboration and communication technologies; for instance, people are already enabling auto dictation. Simple communication techniques will become common with patients, their data, and integration of that into practice.
management, in collaboration with staff, and referrals to adjunct therapies, or specialists. Records can be shared with other clinicians, staff, payors, therapists. An image record can be annotated showing changes, and can further include video/voice or any other media, in 2D or 3D. Again, the technology is coming from outside the health world.

All this will increase the pressure on security and privacy: archiving, encryption, file transfers, logins, are all key components of any health systems now. These principles have their origin in military and banking security systems development, but are part of what a single user must implement to safely share data via the internet. While mostly defensive technology, it is critical. No systems are immune to hacking, and with big changes coming into the digital clinic, dentists are going to be pressed to assure that not only their patient records, but also their 3D scanning and laboratory systems etc. are not being hacked. As for HIPPA, it’s the standard that isn’t really a standard yet. We can expect some big changes to that too. For mobile, the FDA is beginning to manage things, but there is so much happening that they simply don’t have the resources to provide much oversight; therefore FDA compliance will not mean tested and approved.

At my recent video tracking demo at CARDP – Montreal, I presented some data from trials of a head and neck scanning routine and a live demo of jaw tracking with a smartphone. I use my iPhone6 to measure cranial and cervical movement, muscle spasms, TMJ condyle translations, differentiations of CR–CO and so on. Measureable jaw, head and neck biomechanics could be expanded to include many subtle variances. I decided to take on the idea of using rapid image processing techniques that had been learnt in image correlation, to video tracking. Its truly amazing to see complex movements simplified into a first effort of standardized graphics.

If simple movement analysis is standardized then it reduces the subjectivity and brings it down to what it should be, a simple check, not a diagnosis. If the data becomes good enough to be used to envision inter-joint functions, based on known patterns and probabilities, an output that simulates the actual TMJ condylar function is very appealing. I can say that it works, that I am using it on my smart phone, but the TMJ app will not be in the product pipeline until there has been a lot of validation and analysis to correlate and correct for things such as occlusal interferences in lateral deviations.

According to the basic rules of biomechanics, an ideal jaw opening path should be pretty straight up and down, with no serious lateral deviations and smooth acceleration and deceleration. Using a pattern analysis routine, my automated jaw movement analyzer characterizes the variables and interprets these based on a pattern. So in such cases, even if the data were not perfectly accurate, one could repeat the movement and then see if the patient is making a repeatable pattern; all in a few seconds, with very inexpensive technology.

And that brings me to another place. Those who know me, remember the low cost 3D dental scanner we built in 1986 powered by a handwired 286 computer running in turbo mode at 17kHz. An equivalent effort now is underway; except we are now using a smart phone platform running at 1.2GHz. Imagine a low cost 3D scanner based on a smartphone platform; it is coming. Other things I am involved with include digital auscultation, automated infection analysis perhaps for characterizing periodontal tissue, new methods to manage massive CT and other data sets into simple non battery consuming, visualizations for a mobile phone. I know of a few other projects as well such as optical periodontal probing, interproximal scanning and correlation of image with radiographic data, and more than one of the big digital dental companies is talking about how to become the digital hub of dentistry.

Technologies are evolving, and developers, marketers and users of these technologies will have to evolve too. The App world and social media, love it or hate it, are defining the world that developers need to survive in. I hope that collaboration and practice based research are potential outcomes of mobile health. I imagine an online community of dentists first testing and then reporting, where results will be shared at the click of a button. When good clinical results are combined with staff education, patient direct marketing and CE credits, many dentists will be happily part of the wave that drives mobile practice towards a new generation of mobile learning tools.
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Une nouvelle génération de pratiques
et d’outils d’apprentissage mobiles

Bruce Adams

Quand je repense à mes 25 ans de carrière dans les systèmes médicaux, les améliorations apportées sur le plan de l’électronique, de l’optique et de la conception sont tout à fait incroyables. Du point de vue de l’ingénierie de systèmes, il est de plus en plus facile de prédire les circonstances opportunes, puis de développer des choses moyennant un budget plus modeste, notamment engager des cliniciens, « payeurs » et patients à s’inscrire dans un cycle de développement. Plusieurs composants qui coûtaient des millions de dollars à développer en 1990 peuvent maintenant être achetés sous forme de modules, souvent pour moins de quelques centaines de dollars. Dans ce contexte, j’ai choisi de parler de l’historique de certaines technologies émergentes.

Pensez à quelques-uns des domaines d’intervention de la technologie actuelle: veille stratégique; modélisation financière; communications; analyse de données; et exploration de données. Vous pourriez vous demander ce qu’ils ont en commun avec la pratique clinique dans un avenir rapproché. Comme plusieurs d’entre nous utilisent un téléphone intelligent et que l’industrie des technologies mise sur cette plateforme, le progrès qui sera accompli dans d’autres professions contribuera à définir les éléments clés reliés aux plateformes de services de santé. La sphère médicale est un terrain un peu ingrat, car les innovations y évoluent lentement, mais on dénote néanmoins des similitudes dans tous les secteurs d’activité.

L’analytique de données volumineuses a d’abord été introduite dans le domaine financier. Au début du siècle dernier, les bacheliers appliquaient des principes mathématiques aux modèles financiers en utilisant des concepts comme la loi de Gauss et le mouvement brownien. En tant que nouveau concept, il était sujet de controverses.


Les imageries 2D-3D-4D sont à nos portes. Grâce à elles-ci, nous obtiendrons de meilleures données et des interprétations plus pertinentes en temps réel. Cet aspect critique, l’interprétation, ne fait présentement pas partie du paysage; en effet, plusieurs docteurs se tournent encore vers les négatoscopes pour visionner des images sur pellicules. Ceci explique pourquoi les produits qui utilisent la détection par fluorescence n’ont pas l’impact qu’ils pourraient avoir. Il peut être difficile d’interpréter des changements dans les tissus si vous n’êtes pas un expert, et ce, même si vous utilisez d’excellents outils. Mais tout ceci est sur le point de changer.

À la fin des années 90, j’ai travaillé dans un laboratoire de pathologie, où j’ai créé un spectrophotomètre pour évaluer divers types de tissus humains. Au moment de caractériser les résultats, j’ai réalisé que les données constantes par patient étaient plus importantes que les données spectrales, à quelque moment que ce soit; dans ce cas, le ratio d’eau, d’hémoglobine, d’oxygène et de fluorescence ainsi que d’autres caractéristiques optiques. Les niveaux sont légèrement différents pour chaque type de tissu et chaque personne, mais on dénote néanmoins des similitudes dans tous les secteurs d’activité.

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excède de loin ce que l’œil peut voir, permettant ainsi d’établir des diagnostics plus rapidement. La question est : comment intégrer ces technologies dans le processus de diagnostic?


L’utilisation clinique d’appareils photo numériques était néanmoins problématique à certains égards. Le premier et le plus important facteur était que personne ne traitait une capture d’image de la même façon, alors à la fin de la journée, il fallait l’identifier, puis l’acheminer par courriel au laboratoire pour qu’elle soit traitée. De même, comme le patient était retourné chez lui entre-temps, le docteur ne pouvait commencer le processus clinique. Enfin, s’il souffrait un problème quelconque, selon les règles ABCD en dermatologie requièrent une série chronologique. Arrive alors le téléphone intelligent, la plateforme tout indiquée pour définir les services cliniques appropriés; essentiellement, le marketing direct basé sur les besoins des patients; et l’évaluation des probabilités. Parmi mes intérêts se trouvent aussi les communications et l’informatique, qui touchent tous les aspects de la société. J’ai demandé à Ted DeVries d’Exan, un chef de file dans le domaine de la dentisterie, ce qu’il en pensait, et il a répondu :

« Personnellement, je crois que la technologie dans le domaine de la santé sera à l’instar de n’importe quelle industrie. Les demandes de nos patients en matière de technologie seront les mêmes que dans les autres aspects de leur vie. Ils voudront avoir toute l’information médicale sous la main, au moment qui leur convient, à l’endroit qui leur convient, que ce soit sur un ordinateur, dans le confort de leur maison, ou un dispositif mobile. Leurs demandes d’information ne ralentiront pas, mais augmenteront constamment, au fil du temps. Dans cet avenir rapproché, les patients n’accepteront pas d’attendre pour avoir cette information, et tout manque d’information sera associé à un cabinet ‘aux pratiques désuètes’. Les patients évalueront les fournisseurs de services de santé par leur habileté à être ‘à jour’ dans leur domaine d’expertise. Les gens commenceront aussi à évaluer la compétence de leur fournisseur d’un point de vue technologique. S’il n’est pas à la fine pointe, ils auront tendance à présumer que ses compétences sont aussi dépassées. »

Le téléphone intelligent est la plateforme tout indiquée pour les technologies collaboratives et de communication émergentes; par exemple, les gens maîtrisent déjà l’utilisation d’un dictaphone. Des techniques de communication simples seront chose commune pour les patients, leurs données, tout comme leur intégration dans les pratiques de gestion, en collaboration avec les employés, pour des références à des thérapies auxiliaires, ou des specialists. Leurs dossiers pourront être partagés entre cliniciens, employés, payeurs, thérapeutes. Une image du dossier pourra être annotée, démontrant les changements, et même inclure une vidéo/voix ou tout autre média 2D ou 3D. Encore une fois, la technologie possède une dimension extrinsèque à la sphère médicale.

Ceci viendra intensifier les questions de sécurité et de vie privée : l’archivage, le cryptage, les transferts de fichiers, les connexions sont maintenant des composants clés de tout système de santé. Ces principes proviennent du développement de systèmes de sécurité pour l’armée et les banques, mais font partie intégrante de ce qu’un utilisateur doit implanter pour partager en toute sécurité des données sur Internet. Bien que ce soit surtout une technologie défensive, elle est néanmoins essentielle. Aucun système n’est à l’abri du piratage, et avec les grands changements qui se profilent à l’horizon dans la clinique numérique, les dentistes devront assurer la sécurité non seulement de leurs dossiers patients, mais aussi de leurs systèmes d’imagerie 3D et leurs
l'analyse automatique des infections, possiblement pour la caractérisation de tissus parodontaux, de nouvelles méthodes de gestion de CT multiples et d'autres données de visualisations sur un téléphone mobile peu énergivore. Je sais que d'autres projets sont aussi sur la table dans le domaine, comme le sondage parodontal optique, la numérisation des interproximales et la corrélation de l'image avec des données radiographiques, et plusieurs importantes compagnies dentaires spécialisées dans le numérique cherchent à s'imposer dans ce créneau porteur d'avenir.

Les technologies évoluent, et leurs développeurs, spécialistes du marketing et utilisateurs devront eux aussi évoluer. Le monde des applications et des médias sociaux, qu'on le veuille ou non, est en train de définir le monde dans lequel les développeurs seront appelés à survivre. J'espère que la collaboration et la recherche axées sur la pratique sont des issues potentielles pour les services de santé mobiles. J'imagine une communauté de dentistes en ligne testant et évaluant des produits, puis partageant l'information d'un simple clic. Avec de bons résultats cliniques combinés à la formation du personnel, au marketing direct auprès des patients et aux crédits d'EC, plusieurs dentistes seront heureux de faire partie de cette vague novatrice vers une nouvelle génération d'outils d'apprentissage mobiles.

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Leading dental equipment manufacturer NSK Dental LLC today announced that its recently launched iCare handpiece maintenance system is enjoying a very strong reception from dental practices.

The iCare system makes it possible for dental practices to perform handpiece maintenance with the simple touch of a few buttons. This state-of-the-art system allows the practice to give each type of handpiece its own cleaning program, which includes specifying the volume of lubrication oil to be injected to ensure consistent and cost-effective operation. In addition, an advanced chuck-cleaning function makes it easy to effectively remove dirt and abrasive powder from the inside of the chuck to ensure smooth operation and prevent chuck-related problems. This maintains the optimal condition of handpieces and greatly extends their operating life.

Additional information about the as well as other NSK Dental products, can be found at www.nskdental.com.

ITI launches next generation e-learning platform

Groundbreaking e-learning platform offers unique user-centric approach that guides learners at every level of experience through a continuously expanding implant dentistry curriculum.

The International Team for Implantology (ITI), a leading academic organization dedicated to the promotion of evidence-based education and research in the field of implant dentistry, today launched its most significant educational offering to date, the ITI Online Academy.

Built from the ground up to meet the needs of implant dentistry professionals, the ITI Online Academy combines high quality, evidence-based content, maximum flexibility and ease of use to deliver a motivating and rewarding learning experience. A comprehensive peer-reviewed curriculum made up of optimally structured learning modules addresses users at all levels of knowledge and experience. The modules are supplemented by a broad range of additional learning materials such as recorded lectures, clinical videos and case studies that combine to provide focused learning pathways.

The ITI Online Academy is being continuously updated and extended. To complement the current offering, further educational formats will be added over time. Anyone with an interest in implant dentistry should register now for a free lifelong account at http://academy.iti.org.

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For more information contact: www.sirona-connect.net
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- Dr. Mark Antosz, Antosz Orthodontics. Calgary, AB
Reason for Incorporating

Q When should I incorporate?

Darrell Tracey answers:

I get asked this all the time by young dentists. This is what I tell them: “It depends on the situation.”

Arguably, the main reason for incorporating as a dental practitioner, or in any business, is to save or defer taxes so the with the individual’s ability to take advantage of these tax benefits which arise from the Canadian graduated personal tax rate system favoring the spreading of income among more people to keep individual taxable income levels below the highest rate brackets. A professional corporation allows you to do that. Also, to stimulate small businesses, the corporate tax rate on active business income is comparatively very low. A dental practice is an active business for this purpose.

It may be time to incorporate if either of these factors applies to an extent sufficient to justify the costs:

• You have lower income family members with whom you can split dividends within the restrictions of your provincial governing body (College) as to whom may own shares;
• You do NOT require personally all the cash you generate in the practice.

It is too soon to incorporate if these comments describe your situation:

• You are single or your immediate family members have incomes too high to utilize income splitting;
• You have personal cash flow needs that require all of the profits from the practice (for example, student loans or big mortgages).

While there are other things to consider which are beyond the scope of this brief outline, it really is simply a matter of assessing your current situation. I encourage you to consult an experienced advisor for advice specific to your current situation and jurisdiction.

Team Bonus Plans

Q My question pertains to our bonus plan for staff members which has been in place for about five years. Records show our staff have been receiving a bonus about ten months of the year. I’m an office manager and have been asked by my employer to develop a better method of incentivizing staff. My question is: How do I begin this task?

Dale Tucci explains:

This question sounds very straightforward, when in fact it is a complex task to undertake due to the length of time the bonus has been in place. Without knowing more about the details of the incentive plan it is difficult to give you advice.

What I can offer is some general thoughts and ideas about practice bonus plans based on my consulting experience over the past three decades. To begin I think many dentists believe an incentive program will help motivate people and
improve practice outcomes. Although this may hold true when team receive the bonus on a monthly or regular basis it is likely due to the goals being too easy to achieve rather than for stellar team performance. Therefore, step number one is designing an incentive plan based on goals or targets that require exceptional efforts to reach. Goals should be based on the S.M.A.R.T. model which is an acronym for Specific, Measurable, Achievable, Relevant and Time-bound.

Here is a quick review of the meaning of S.M.A.R.T. as a tool to set goals:

Specific: This should address the who, what, when, where and why around goals and are time-bound actions.

Measurable: Goals should be numeric or quality based.

Attainable: Set goals that can be a stretch to meet but are still attainable.

Relevant: Goals should be linked to the departmental and organizational goals.

Time-bound: The expected timelines to meet goals should be defined and progress checked regularly.

If you have never used this model before this is an appropriate time to use it as a guide to develop goals on which incentive plans can be created.

Your opening comments indicated team members typically receive a bonus about ten months of the year. If this has been the case for several years, team members likely consider the bonus payment part of their compensation. From my vantage point, the most repetitive problem I see in dental offices is flawed bonus plans that are not reassessed yearly. Generally speaking I would describe dental office bonus plans as “evergreen” meaning that once they are developed they usually remain in place for more than a year before being reviewed and redefined based on the goals of the practice. So my advice, once an incentive plan has been detailed take the time to assess the structure and make necessary adjustments yearly.

Next you must consider the bonus from the point of view of team members. By this I mean, if staff have been participating in a bonus plan for years and have not been advised of new goals to receive a bonus they believe business as usual is the expectation of the organization. My advice here is to consult the practice lawyer about this matter before
making any formal changes or announcements about a new bonus structure.

I would ask you to meet with the practice owner and ask a fundamental question; “What is the intent of offering a team bonus plan?” If it truly is to motivate people towards exceptional performance then the criteria around performance may need to be developed by department rather than practice overall. For example; a bonus based on meeting overall practice production and collection targets where all team members receive a pro-rated amount based on their working hours rewards and acknowledges all employees. If this is the plan you choose then stellar employees and mediocre employees are awarded equal bonus amounts based on working the same number of hours. If this fits into your belief system then this structure can be developed with advice from the practice accountant. The accountant would meet with the dentist and together they would determine an appropriate percentage of profit to share with team members. I would not undertake designing or implementing a bonus plan without this key advisor as this is a significant financial decision.

If the above structure does not meet your needs consider developing bonus plans based on the performance of each department. It will take time for the practice owner, accountant and practice manager to determine performance targets but this task can be achieved when all collaborate. For example performance goals for business personnel could include: collecting 98% of production, meeting specific goals for managing provider production, meeting provider downtime targets and/or meeting specific case compliance goals. By establishing goals by department the people responsible for meeting performance goals and thus receiving a bonus are rewarded for their efforts. When an organization has departmental goals it is possible that some but not all employees participate in an incentive in any given period of time.

When all is said and done defining employee bonus plans require time and thought. Those put together in haste will be fraught with problems. To office managers and dentists alike invest the time to meet with your lawyer and accountant to ensure the viability of the bonus plan and the frequency it will be awarded to team members.

Changing Contract

Due to the growing demands on our practice, we plan to alter the working hours of a couple of our dental nurses. However, we have spoken to both and they are not happy about changing as they have outside activities which clash with the proposed new times. Can we enforce this change on the employees as it is a genuine business need?

Liz Symon explains:

It is very difficult, but not impossible, for an employer to alter an employee’s terms and conditions of employment. Like all legally binding contracts, the terms of an employment contract can only be altered if both parties agree to the changes.

The terms of a contract are the rights and obligations that bind the parties together. In order to change a term of an existing contract of employment, consultation and agreement needs to take place. The practice will need to fully consult with both nurses and explain the reason why the change is needed.

The practice should have individual meetings with each staff member to discuss the staffing plans of the practice and why there is a need to alter their hours. It is important to listen to their views, discuss any concerns they have and the reasons why the employees are not keen to change.

If the dental nurses agree to the change in their finishing times, the practice should confirm this in writing. If agreement cannot be reached, then one option the practice has is to impose the change upon them. This may lead to a potential breach of contract claim by the employee if the change is deemed to be fundamental. A fundamental change will include such aspects as pay, hours, contractual sick pay and holiday entitlement.

There is also a risk that, if the dental nurses feel the practice has acted unreasonably, one or both of them decide to leave their employment and raise a constructive dismissal claim (depending on their length of service).

Another option is to terminate the original contract, giving the proper notice, and offer the dental nurses re-engagement under a new contract, with the revised working times. In this situation there will be no breach of contract, but the termination of the old contract will be regarded as a dismissal and open to a claim of unfair dismissal.

When a practice terminates the old contract and offers a new one, it is essential that the matter is handled correctly. When considering whether a dismissal has been fair, some of the aspects that an employment tribunal would consider include:

- The business reasons for the change
- The employee’s reasons for objecting
- If any alternatives to dismissal were considered
- Has a fair procedure been followed
- Have majority of other employees accepted the change
- The benefit to employer versus the adverse impact on the employee.

The subject of changing terms and conditions is a contentious one, and any dental practices with concerns in this area should always seek legal advice before taking any action.
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In virtually all of my past articles, the focus has been on how to succeed, be successful and achieve success. It is said that we learn more from failure than from success, and so this time I thought it might be fun to explore the most common ways in which dentists fail.

Here’s my Top Five Ways To Fail in Your Dental Career:

5. Allow others to make your career and business decisions. This includes your accountant, lawyer, mother, father, spouse, girlfriend/boyfriend, partner, or advisor. Nothing in life is perfect but diluting your dreams to appease others can lead to conflict, bitterness and resentment – all devastating to a relationship. You will have to live with the consequences of your decisions. While this may give you some relief and reason to point a finger of blame later, it is wise to remember that at that same moment there are three more fingers pointing back at you. Grow up and make your own choices. Base your decisions on your own vision, core values and strengths. Consider what you will have to do, what you will need to sacrifice and how these things will affect others. Formulate measurable goals and objectives with deadlines, and write them down. Make them challenging but achievable. Share these with those who will be part of and affected by your plan so that they know what to expect and can support you along the way.

4. Focusing solely on monetary gain. Who we are is not defined by what we have. While I agree that all goals must be quantifiable, a dollar amount is not the only measurable outcome. I ask you to consider money as a tool. That tool can be used in a variety of ways – we can spend it, we can save it, and we can invest it. The way that we think about how we use money speaks to our values and core beliefs. For example: Do you consider practice acquisition a purchase or investment? When we measure our success in monetary or material ways, we are more apt to risk our integrity. When we focus on how we can improve the lives of others by helping them to achieve their goals through our skills, talents, efforts and good fortune, we are rewarded. What we do (and how we do it) makes us who we are and that results in what we have.

3. Believing that easy and simple have the same meaning. Every situation has multiple impacts and aspects to consider; like ripples from a pebble tossed into a pond so are the results from the situation and any possible actions taken to resolve it. Easy is seldom simple, and simple is rarely easy. Taking the time to consider others who are affected by the situation as well as yourself is not easy. It is much easier to think only of yourself, especially when facing a traumatic or devastating matter. We are conditioned to survive first – even the instructions for using the emergency oxygen masks tell us to don our own first and assist others after. Using response techniques rather than reaction provides time to process both the situation and its impacts – to identify not just the symptoms but also the root of the problem. This also allows time to weigh options available to address the matter in a strategic and confident manner. Use appropriate tools such as SWOT before taking action.

2. Ignorance. The one thing that we hear from dentists; all ages, genders and at all career stages is that they are not taught anything related to business in dental school. They lament that this is a problem for them as they become practice (business) owners and yet choose not to seek information, knowledge and training related to the things that they “know they don’t know”, let alone the things that they “don’t know that they don’t know”. The result is that they don’t know what questions to ask, who to ask, how to ask and when to ask. This creates vulnerability and fear of the unknown which often pushes them to friends, colleagues and family for advice and guidance. Unfortunately those advisers generally have limited expertise in the unique challenges and
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opportunities that exist in the profession of dentistry and because of the nature of their relationship with the dentist, are reluctant to admit that they are unable to provide the level of assistance required. More often than not, decisions and choices are made based on assumptions and uninformed opinions.

Arrogance. This is demonstrated in many ways but all come from the same attitude of self-importance. Whether you are late for a meeting or appointment (with a colleague, patient, or other person); fail to acknowledge or return a phone call or e mail (especially when you initiated the discussion) or do not follow through with what you have promised (explicit or implied), you may be guilty of this. Feeling entitled to receiving special favors or services that have a benefit you is another sign of arrogance. One piece of advice that I offer to all dental students that I have the pleasure and honor to speak with each year is this – a dental degree and licensing entitles you to work in an honorable profession and serve those in need for the life of your career, in which you will be rewarded in ways that can be counted and most importantly in ways that really count. The quality of your relationships will determine your degree of success, not simply clinical competence. Be humble and respectful of others – their time, feelings and rights. When you do genuinely, you will earn their respect and trust; and that is what will make you successful.

Failure is almost always our own fault. Avoiding these top five will not guarantee that you will never fail but at least you will have protected what is most important – mutual respect and trust – with those whom you rely upon personally and professionally.

Your feedback is always welcome. Contact Nadean via email nadean@mypracticematters.com or visit our website www.mypracticematters.com. Follow us on Twitter; like us on Facebook; connect with Nadean on LinkedIn.

Nadean Burkett is a career and business transition coach with more than 30 years experience in the dental profession – now assisting accountants and other professionals in private practice by referral. Trusted practice evaluator, business planner and respected coach and advisor for the past 10 years – Nadean facilitates The Empowerment Program series, Career & Practice Management for Dentists both online and from NBAI’s head office situated in beautiful Vancouver, British Columbia. Visit www.mypracticematters.com, e-mail nadean@mypracticematters.com for listings, job postings, and more resources with your practice transition coach.
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Ebola – *Hold your breath or Get Rational*

Dean Swift, B.Sc. B.Ed. FADM Cert. Tox.

### Introduction

After terrorism, *Ebolavirus* has been the most frequent participant in the world media spectrum. The resulting disease from this viral infection is truly horrific leading to a painful death in a very short time. All the North American hype and belly-button gazing is difficult to understand if you don’t have the background to put it in context.

If we don’t contribute, this situation will become a problem for all of us.

The true worry is for the people of West Africa at the *Ebolavirus* epicentre. Poor sanitation, water quality issues and hospitals without the basics should dominate the discussion. Unfortunately, the two aid workers sent back to the US for treatment helped create the media frenzy. Then the death in Dallas and the two subsequent cases really created an uncomfortable paranoia. This severe distraction took our (Western) focus away from the African epicenter. Paranoia has lead to blocking supply ships to West Africa. Presently only one airline is flying in to the region from Europe. There are shortages of food, medicines and protective gear resulting in skyrocketing prices.

Medical teams started managing this outbreak as if it were Malaria or Typhoid back in March 2014 in rural areas of Guinea, Sierra Leone and Liberia. The knowledge about *Ebolavirus* was minimal and lead to misdiagnoses. As of the beginning of November, over 14,000 cases have been recorded with a 60% mortality rate.

There is a real endemic need for a vaccine to stop this disease from becoming a continental scourge. The key to preventing further suffering is to promote early detection,
without the feeling of stigma, and to build a trustful health care system in Africa.

The Facts

The original epidemic began in 1976 in Zaire and the transmission vector is believed to have originated from Fruit Bats. *Ebolavirus* is a hemorrhagic virus that leads to a high fever and subsequent organ membrane breakdown with severe internal bleeding. Its effects are similar to Marburg and the North American Hanta virus. It is quite remarkable that this outbreak in West Africa is 5,000 km from the area of previous outbreaks. At the beginning, in Sierra Leone and Liberia, there were only 200 local doctors serving 10 million people. During the past 6 months 1/3 of these doctors have died.

The saving grace of this epidemic was that Médecins Sans Frontiers (MSF) was in the area as part of a Typhoid project. MSF has participated in 10 previous Ebola epidemics or outbreaks since the beginning. The MSF field force has grown from 300 to 2,000 in the past 6 months. MSF, as a volunteer based group were very understaffed as they were, and are still, handling 60% of the cases. The local Health Systems collapsed as people travelled to cities for help and spread the disease to dozens of distinct areas including large cities like Monrovia. These are conditions that are already present on a regular basis, but because the clinics are so full of Ebola patients, people with other conditions such as malaria just can’t get the care that they need.

Funeral traditions, such as returning the dead back to their villages with intimate end of life ceremonies, have only exacerbated the situation.

Where we go from here

I am no infectious disease expert, but I can guarantee that there are very few knowledgeable people on this continent who have first hand experience with the *Ebolavirus*. What I can explain is that the principles of infection control have at this time, once again, gone off the rails, as they have so many times in the past. The key to managing this crisis is to control each case correctly, by having thorough follow-up and giving education that minimizes stigma and enhances trust in the Medical system.

From a disinfection point of view, *Ebolavirus* is very easily inactivated by almost all disinfectants. It is an enveloped virus, which, in simple terms, means it has all of its “junk” on the outside of its envelope, much like HIV and H1N1. Products such as BioSURF are effective in as little as 20 seconds against similar types of viruses.

Infection Control has to be a global concern. We must collaborate and coordinate as “earthlings” in these endeavours. My suggestion, should you be very concerned about the plight of the African continent, is to support Médecins Sans Frontiers (MSF Doctors without Borders) who have been and continue to be the lead agency in so many humanitarian emergencies.

Dean Swift B.Sc. B.Ed. FADM Cert. Tox. Research Director Biolennia Laboratories, Toronto, Canada

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Clinical Practice Guidelines are relevant to Dentistry

Les guides d’exercice clinique sont pertinents dans le domaine de la dentisterie

Abstract

Clinical Practice Guidelines are an evidence-based tool to transfer scientific knowledge to clinical practice with the aim of optimising patient care. CPGs should be understood as being a clinical tool that makes accessible the latest relevant scientific evidence in an approachable and unthreatening way, for the benefit of both the busy clinician and the inquiring patient. Society understands dentistry to be an applied science. Ignoring evidence-based CPG in clinical practice invites the erosion of public confidence and trust in the dental profession.

Key words

Clinical Practice Guidelines, Evidence Based Dentistry

Résumé

Les guides d’exercice clinique sont des outils factuels visant à transférer les connaissances scientifiques au sein des pratiques cliniques dans le but d’optimiser les soins destinés aux patients. Ceux-ci devraient être perçus comme des outils cliniques facilitant l’accès aux plus récentes preuves scientifiques pertinentes, d’une façon conviviale et rassurante, au bénéfice du clinicien affairé et du patient qui cherche à obtenir des réponses à ses questions. La société considère que la dentisterie est une science appliquée. En ignorant les guides d’exercice clinique factuels dans la pratique clinique, la confiance du public envers la profession dentaire pourrait s’éroder.

Mots-clés

Guides de pratique clinique, Dentisterie fondée sur les faits

Clinical decision making requires the dentist and the patient to decide on the best course of action amongst a number of competing treatment options. This decision is made in a world of uncertainty and choice. To quote Sir William Osler, “[clinical practice] is a science of uncertainty and art of probability”. Nonetheless, clinical decisions are ideally based on the best information available at the time. Evidence-based dentistry (EBD) promotes “best evidence” decision making based on a systematic process of considering the dentist’s clinical experience, the patient’s values and preferences, and relevant scientific research.¹

The last point is significant, as patients regard the dental professional to be an expert in oral sciences. They expect the dentist to be current in relevant scientific knowledge and its application to dental care. However, it is challenging for the busy clinician to stay abreast of scientific research in an era where knowledge grows at
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Clinical Practice Guidelines (CPGs) are a tool to transfer scientific knowledge to clinical practice with the aim of optimising patient care. High quality CPGs are based on the procedures of EBD, including a systematic and transparent process of summarising the best scientific information applicable to typical clinical scenarios. The guidelines are not just a summary of the gathered research, but a critical appraisal of its results and conclusions based on its validity, precision and generalisability to the clinical context. CPGs include recommendation statements on therapy that are based on the quality of the best current scientific evidence, the side-effects of the therapy and risk of harm, cost effectiveness, and the value and preferences of the patient. High quality CPGs are considered the “strongest resources to aid dental professionals in clinical decision making and help incorporate evidence gained through scientific investigation into patient care.”

However, a recently published article contains the remarkable claim that CPGs “… need to be based on faultless research … [and thus]… are of limited value. Ultimately, the decision on care will be determined by the practitioner’s judgment tempered by knowledge of patient’s needs. It was ever such.”

To suggest that science must be faultless for it to be relevant is extraordinary, to put it mildly. Of course there is error in any body of research, but reasonable people do not deny the power of science to advance knowledge and impact society. It is precisely the error correcting mechanisms inherent in the scientific process – the removal of bias through the discipline of evidence – that makes it so important.

The author seems to be promoting a return to an antiquated model of health care delivery based solely on “expertise”, with little attention paid to the patient’s voice and trivialising the science that dentistry should be based on. The field of medicine has already had its struggle with this paternalistic view of care, and rejected it in favour of an evidence based approach. As a result, CPGs are ubiquitous in medicine. And now there is a growing number of evidence-based CPG for dentist that are freely available on the internet.

CPGs should be understood as being a clinical tool that makes accessible the latest scientific evidence in an approachable and unthreatening way, for the benefit of both the busy clinician and the inquiring patient. CPGs are not meant to direct dental practice, but to guide clinical decision-making, along with the clinician’s expertise and patient preferences and value.

Society understands dentistry to be an applied science. To argue that CPGs, and thus the science they embody, have no role to play in patient care is to deny the scientific foundation that patients and society expect from dentistry. Ignoring evidence-based CPG in clinical practice invites the erosion of public confidence and trust in the dental profession.

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Dr. Balevi received degrees in Engineering and Dentistry from McGill University. He completed a dental residency at St Michael’s Hospital in Toronto while teaching and pursuing research in dental material at the University of Toronto. He completed a Master of Science degree in Clinical Epidemiology / Evidence – Based Healthcare at the University of Oxford (U.K.).

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Dental implant planning aided by a radiological diagnostic template using the Nobel Biocare all-on-four protocol

La planification de l'implant dentaire assistée par un modèle de diagnostic radiologique utilisant le protocole Nobel Biocare All-on-four

Abstract

Endosseous dental implants have been used to provide prosthetic replacement from a single tooth up to completely edentulous ridges with successful long-term outcomes. Accurate diagnosis enhances this already highly successful dental implant therapy. This article presents the diagnostic planning phase, aided by tomographic templates and computer software, for two patients preparing for dental implant treatment.

Key words

computer, software, diagnostic, template, dental implant planning, pre-surgical planning for implants, all-on-four.

Introduction

Endosseous implants have been used in patients to replace from a single missing tooth up to complete edentulousness with two possible solutions: fixed and removable prosthodontics.\textsuperscript{1,2} In order to complete the diagnosis and to select a proper treatment plan, it is necessary to use the aid of a bi-dimensional (i.e. orthopantomography) and more often tri-dimensional (3-D) radiographic technique (i.e. computerized tomography) in pre-surgical assessment of implant sites.\textsuperscript{3,5} When the patient has selected a treatment with endosseous implants, the radiographic technique should complement the anatomic findings and the planned rehabilitation by the means of a radiographic template. Utilizing a correctly developed radiographic template will help ensure the correct position of the dental implants and improve the ability to provide a predictable outcome.
Les implants dentaires endo-osseux sont utilisés pour assurer un remplacement prothétique d'une seule dent ou de crêtes édentées complètes avec succès à long terme. Un diagnostic précis améliore la thérapie d'implant dentaire qui a déjà un grand succès. Cet article présente la phase de planification de diagnostic assistée par des modèles tomographiques et de logiciels pour deux patients prévus pour le traitement d’implants dentaires.

Résumé

ordinateur, logiciels, diagnostic, modèle, planification de l'implant dentaire, la planification pré-chirurgicale pour les implants, all-on-four.

Mots-clés

The “All-on-four” protocol (Nobel Biocare AB, Göteborg Sweden) provides a fixed or removable method of rehabilitation (with an overdenture supported by a bar) utilizing the placement of four implants within the edentulous maxilla or mandible. With the use of a radiological or tomographic template and Computerized Axial Tomography (CAT), a surgical guide is fabricated to assist with the precise placement of the implants during the potential flapless surgical procedure.4,6,8 There have been reported errors in treatment planning while using these types of surgical guides. Most of the errors were due to the incorrect fabrication of the tomographic templates, their misfit during the tomographic procedure, the absence of some of their components, and the variation and specific features of the software planning.8,9 Some of the factors related to incorrect fabrication may be:

1. Misfit during the tomographic procedure. Since the guide is a duplicate of the template, any misfit (retention, support or stability) will be transferred to a surgical guide during the virtual planning.

2. Lack of support of the template while taking the CAT scan. Lack of the correct seating of the template could happen while placing it in the patient, even when it appears to be well adapted.

3. Not knowing the protocol for tomographic study. Nobel Clinical indicates: use gutta-percha as a contrast medium, DICOM format file and tomographic images (virtual ‘slices’) of 0.5mm.

4. Insufficient anchor pins. These pins are placed virtually during the planning phase and must have a buccal flange in the template to place the pins and anchor over the ridge bone. These have to be placed properly to guarantee stability during the drilling phrase.

5. Insufficient radiopaque elements (gutta-percha points).

6. Insufficient thickness of the guide. This kind of guide could fracture at the moment of surgery.

7. Lack of knowledge of the anatomical structures involved. In planning, there could be clinical consequences when invading any structure: nerve, vascular, maxillary sinuses, tooth-implant distance, implant-implant distance, apical-coronal depth, thickness of the osseous plates, etc.

There is a lack of evidence in treatment modalities that use the Nobel Guide guided-surgery system. The need to provide information and training about this technique is highly recommended for clinicians involved in the planning of dental implants.4

The Tomographic Template

The template could be a duplicate of a proposed prosthesis, a provisional restoration in the case of a fixed partial denture or a removable prosthesis in the case of a complete denture.10 These templates are modified and a radiopaque element (metallic pellets, guide tubes, gutta-percha, barium sulfate) is integrated in their structure during manufacture to complement the radiographic information (2-D or 3-D) of the remaining bone and anatomic structures related to prosthetic information.3,5 The template could also be used as a surgical guide for the dental implant placement.

A tomographic template must fulfill the following conditions:

1) In the case of a complete edentulous patient, the template has to be fabricated with a rigid material in order to get stability and to be supported by subjacent structures during the tomographic procedure.

2) For the partially edentulous patient, the rigid base of the template supported by adjacent teeth must have a window to visually verify the correct placement. Once the surgical guide is available, and since it is a duplicate of the template, adjustment is usually necessary before the actual surgical procedure.5,10

3) It is necessary to have an inter-occlusal registration to ensure stability with the opposing arch.

4) It is necessary to have radiopaque elements as a reference for the definitive restoration during
In the Nobel protocol, cases should contain at least six gutta percha points (1.5mm diameter and 1mm deep) placed on the vestibular flange and at least three points at the palate surface to facilitate the virtual overlap of the template itself and the template placed in the mouth of the patient.

5) The tomographic template must be easy to manipulate and insert in position in case the patient has to place the template by himself.

6) The template must have in its design vestibular flanges in order to place attachment pins on the guide during software planning to ensure bone subjacent support during the surgical procedure protocol.

7) The template has to have enough pins and be placed as a tripod to guarantee absence of movement during surgery.

Material and Methods

There are three alternatives to fabricate tomographic templates. These alternatives are achieved

1) by duplicating a diagnostic wax and creating flanges for the template,
2) by using a provisional restoration in the edentulous space where the implants can be placed,
3) by duplicating or modifying a denture which can be used as a provisional prosthesis for immediate loading.10

This study is a case study based on two clinical cases in which the above first two alternatives were utilized.

First Clinical Case

This case is about a patient who was diagnosed with generalized periodontal disease and deficient periodontal support of remaining maxillary teeth (Figure 1).

The following maxillae treatment plans were offered to the patient:

1) immediate denture placement after teeth extraction and surgical modification of the alveolar process,
2) extraction of remaining teeth, alveolar osteotomy, alveolar bone preservation,11 placement of 4 implants for an “All-on-four” implant-supported overdenture, and
3) extraction of remaining teeth, surgical modification of the alveolar process, alveolar bone preservation,11 and placement of 4 or more implants for an “All-on-four” implant-supported fixed prosthesis.

The patient preferred the third treatment option. Primary casts were obtained in order to fabricate an individual impression rim for a physiological cast. An inter-maxillary registration made of silicon diminished
the degree of movement of the remaining teeth and the casts were transported to the semi-adjustable articulator (SAA) (Figure 2).

For the template fabrication, a trial arrangement was made accounting for the upper lip support and maxillary teeth incisal borders. A mock-up trial was made to increase the predictability (Figure 3). The extractions were simulated in the cast and the trial arrangement was completed to explain the expected outcomes to the patient. We then waxed the vestibular flanges for the template fabrication (Figure 4). Finally, the gutta-percha points were placed in order to test the template in the patient’s mouth for the first tomographic scan. The second scan was done for the template alone (Figure 5). The dental implants were virtually and accordingly placed. The surgical guide was created by transferring this information to the Nobel Clinician software.

Second Clinical Case
This case involves a maxillary edentulous patient who presented with a partially edentulous mandible of class II modification 1.

The maxillae treatment plans were:
1) a complete denture,
2) to place two implants for an implant retained overdenture, and
3) to place 4 implants for a fixed implant supported denture. This last alternative was the patient’s choice.

Treatment began conventionally by fabricating one complete denture. Anatomic impressions had to be taken for fabrication of an individual rim. Then, a physiological
Figure 7 — A trial arrangement is created and is duplicated in acrylic for fabricating the provisional restoration, which remains in the mouth at the time of tomography. The tomographic template is designed with vestibular holes to place the gutta-percha.

Figure 8 — Upper image: the trial arrangement on acrylic copings is tried in. Lower image: then the provisional restoration is fabricated, tried in and cemented.

Figure 9 — Left side: the antagonists are tested and a silicone interocclusal record is made over them. Right side: maxillary teeth placed, scalloped denture and creation of palatal rugae.

impression with polyvinyl siloxane was taken to obtain study casts. Next, inter-maxillary relations were taken using a graphic intraoral tracer (Figure 6).

The diagnostic trial arrangement was done over acrylic covers to test them directly on the patient. Once approved, they were duplicated for provisional fabrication (Figures 7 and 8). As mentioned, maxillary template fabrication was conducted by duplicating the denture trial arrangement with silicon, as well as adding six
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* If one-stage surgery with immediate loading is not indicated, cover screws are used for submerged healing.

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vestibular gutta-percha points and at least three on the palatal side (Figure 9).10

The mandibular template was achieved by constructing a cover above the provisional restorations. The template design must have some openings as windows in the anterior zone for visual confirmation of the template and surgical guide sitting. While virtually planning the design, it was also decided to add vestibular flanges for anchorage pins to maximize stability during the surgical phase (Figure 10).

Both, maxillary and mandible templates were stabilized with an interocclusal register for the CAT scan.
Figure 12 — The virtual placement of the mandibular implants shows the relationship of the implant platform with the tooth contours on the template.

For our virtual treatment planning we used the Nobel Clinician software which accounted for anatomic structures related to the implant angulation, diameter, size and final position (Figures 11 and 12). The surgical guide was fabricated. This could also have been considered for flapless intervention and guided the drilling sites.7,8

Conclusion
Fabricating a correct tomographic template is essential to avoid mistakes that may result in an unstable template. These templates may be used in virtual planning with software to duplicate accurate contours for the final prosthesis and accurate position of the dental implants.

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Conflict of interests
There is no conflict of interests.

References

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Restoration of Endodontically Treated Teeth with Zirconia Post Alternatives: Two case reports

Restauration de dents traitées endodontiquement à l’aide de pivots radiculaires en zircone : deux rapports de cas

Abstract

The amount of intact coronal tooth structure and the root canal configuration are among the two important parameters that can directly affect the long term outcome of endodontically treated teeth restored with post and cores. The present case reports describe the restoration of two endodontically treated teeth with two different zirconia post-core treatment modalities. The article also highlights some of the basic criteria the clinician should take into account before choosing the post-core system that best fits the individual needs of each case.

Key words

Endodontically treated teeth, root canal configuration, prefabricated zirconia posts, one-piece zirconia post-cores, CAD/CAM post-cores.
Described for milling one-piece zirconia post and cores by researchers. They stated that the technique provided a one-piece post and core with greater toughness, maximal adaptability to the canal, and adequate esthetics. Post-core acrylic resin patterns were fabricated, scanned, and milled to fabricate one-piece zirconia based ceramic post-cores.

This article describes in detail the procedure of two treatment alternatives for restoring endodontically treated teeth with esthetic post and cores. The clinical cases present in sequence the dental examination, treatment plan, clinical procedures, laboratory procedures and cementation.

Figure 1. Patients pre-treatment photographs (A & B) Fractured upper right lateral incisor (C&D) Final all-ceramic crown cemented onto the post-core assembly.
CLINICAL REPORTS

Case 1: Pre-fabricated zirconia post and ceramic pressed core

Dental examination and treatment plan
A 21-year-old female patient was referred for treatment at the Department of Prosthodontics, Faculty of Dentistry, Istanbul University for a fractured tooth. The intraoral examination revealed that the upper right lateral incisor had fractured (Figures 1 A&B). Patient stated that the fracture had occurred as a result of trauma. The diagnostic radiograph revealed no root fracture defect and the existing root-canal treatment was found to be successful and to be suitable for a post-core procedure. There was no pathological mobility and probing depths around the tooth were within physiological range. After the evaluation of the remaining tooth structure and surrounding soft tissues, the treatment plan was determined to be the implementation of a prefabricated zirconia post followed by a heat-pressed core system and an all-ceramic crown restoration.

Clinical procedures
The remaining coronal tooth structure on the lateral incisor was prepared before the post space preparation. The root canal filling material was removed using Gates Glidden (Dentsply Maillefer, Ballaigues, Switzerland) and Peeso reamers (Dentsply Maillefer, Ballaigues, Switzerland) leaving 4 mm of root-canal filling material as apical seal. After the removal of the root canal filling, mesio-distal and bucco-palatinal dimensions of the root and the root length were taken into account and a prefabricated zirconia post (CosmoPost, Ivoclar Vivadent, Schaan, Liechtenstein) of 17 mm in diameter was selected. A post length of 14 mm was determined to be used; 9 mm of the post inside the root canal and 5 mm...
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as extending to the core portion of the post-core assembly. The root was shaped for the prefabricated post using the corresponding drills of the system. The prepared post space was cleaned with normal saline and dried with absorbent paper points. The fit of the prefabricated post system was checked (Figure 2A) and an impression was taken from the full arch with the post seated intraorally (Figure 2B) The impression was checked to ascertain that the post was fully seated in the impression.

Laboratory procedures
The stone models of the impressions were prepared following the application of the separator liquid to the prefabricated post. The proper fit of the post into the post space was checked by removing the post applying rotating forces and then placing it back to its original position. The core pattern of the post was fabricated using a nonresidual wax material (Inlay Casting Wax, Kerr Cor, CA, USA) over the zirconia prefabricated post. The waxed core with the prefabricated zirconia post was invested with the phosphate-bonded investment (IPS PressVEST, Ivoclar Vivadent). A plunger (Alox Plunger, Ivoclar Vivadent) was preheated in the furnace (EP 600 Press Furnace, Ivoclar Vivadent) and applied to the pressed zirconia enriched glass ceramics (IPS Empress Cosmo Ingot, Ivoclar Vivadent) that were on top of the ring before placing the entire assembly in the furnace at 900°C pressing temperature for 10 minutes, with a heating rate of 60°C/min. After cooling, the ceramic core with the zirconia prefabricated post was divested with airborne-particle abrasion using 100 µ aluminum oxide (Special Jet Medium, Ivoclar Vivadent) at 1-bar pressure.

Cementation procedures
The fit of the zirconia post and all-ceramic core assembly was checked intraorally. The base and catalyst of a silicone disclosing agent (Fit Checker, GC, USA) was mixed and applied to the post and cores surfaces for this purpose. The post-core system was placed in the root canal. The disclosing agent around the post and core surfaces were evaluated for any pressure spot contacts upon removing from the root canal. Necessary adjustments on the internal surface of the zirconia post surfaces were performed using rubber tips (Astropol F, Ivoclar Vivadent) until the post-core fitted accurately to the root canal space. Figure 2C displays the final post-core assembly before the cementation.

The cementation procedure of the post-core system was performed with dual-polymerizing resin cement following the manufacturer’s instructions (Multilink Autolmix, Ivoclar Vivadent). The internal surface of the pressed ceramic core was treated with 5% hydrofluoric acid (IPS Ceramic Etching Gel; Ivoclar Vivadent) for 20 seconds, then thoroughly rinsed and dried. A layer of silane was applied with a brush (Monobond Plus; Ivoclar Vivadent) and was allowed to react for 60 seconds and then dried prior to cementation. Primer (Multilink Primer A&B; Ivoclar Vivadent) was mixed in a 1:1 mixing ratio and applied to the root dentin surfaces. The resin cement was released from the syringe using the mixing tip and applied directly to the post, and the post and core assembly was seated on the root with finger pressure. Excess cement was removed using microbrushes followed by light polymerization for 20 seconds on each surface (Bluephase LED curing unit, Ivoclar Vivadent, Schaan, Liechtenstein) (Figure 2D). Following the cementation of the post-core assembly a final impression of the arches were taken for the final all-ceramic crown. A heat-pressed ceramic crown (IPS Empress, Ivoclar Vivadent) was fabricated for this purpose. The crown was checked in the mouth for colour, occlusion and contours. The internal surface of the pressed ceramic crown was treated with 5% hydrofluoric acid for 60 seconds, then thoroughly rinsed and dried. The crown was cemented on to the root-post-core assembly with dual-polymerizing resin cement following the same stages described above for post-core cementation (Figure 1C & D). The final treatment provided a satisfactory result, meeting the functional and esthetic demands of the patient.

Case 2: One-piece zirconia based ceramic post-core

Dental examination and treatment plan
A 49-year-old female patient was referred for treatment at the Department of Prosthodontics, Faculty of Dentistry, Istanbul University. The intraoral examination revealed that the upper left second premolar tooth had fractured (Figures 3A & B) and the patient already had a recent all-ceramic crown of 2 years. Probing depths around the tooth were within physiological range and there was no pathological mobility. According to radiographic evaluation, root-canal treatment was found to be successful. The fabrication of a custom made, one-piece, zirconia based ceramic post-core system was chosen as a treatment option to support the existing crown restoration and to provide functional and esthetic requirements.
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Clinical procedures
The post space was prepared using Gates Glidden and Peeso reamers leaving 4 mm of root-canal filling material as apical seal. A post length of 13 mm was planned; 9 mm inside the root canal and 4 mm as extending to the core part of the post-core assembly. The canal walls were checked for the elimination of undercuts and the prepared post space cleaned with normal saline and dried with absorbent paper points. Separator liquid was applied on the internal surfaces of the canal walls. An autopolymerizing acrylic resin rod (Pattern Resin LS, GC, IL, USA) was prepared and placed in the post space to check the adequacy of the length of the post. Subsequently an acrylic resin mixture was applied to the surface of the acrylic rod and placed into the root canal. This procedure is repeated until the post resin pattern fits passively and has a good adaptation. The post pattern is then placed inside the canal and the core portion is built using the patient’s existing all-ceramic crown. Following the lubrication of the internal surfaces of the crown, the acrylic resin mixture is applied to the core portion of the rod and the crown is placed on the corresponding tooth in the patient’s mouth. The occlusion was checked by directing the patient to bring her teeth to the intercuspal position. The crown was removed from the tooth prior to complete polymerization of the resin. After essential refinements, the final core built up was generated. Figure 4A displays the final fit of the resin pattern on the root. Great care must be taken not to alter the tooth’s marginal preparation in order to re-use the patient’s existing crown. Using this technique a direct impression of the root canal has been made and a one-piece post-core resin pattern fabricated (Figure 4B). The completed resin pattern was sent to the laboratory for the fabrication of a zirconia post-core.

Laboratory procedures
Titanium dioxide (IPS Contrast Spray, Ivoclar Vivadent, Schaan, Liechtenstein) was sprayed on the surfaces of the resin pattern as a contrast media for optimal imaging, ensuring uniform optical properties and facilitating an accurate scan. The acrylic resin pattern was then scanned (3D Scanner 7 Series, Dental Wings Inc, Montreal, Canada) and a 3 dimensional image of the resin pattern was constructed (Figure 4C). Scanning data were transferred to the milling unit (Yena D40
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Milling Machine, Yenadent, Istanbul, Turkey). One piece post and core was milled from the partially sintered zirconia blank (Vita In-Ceram YZ Disc, Vita Zahnfabrik, Bad Sackingen, Germany) (Figure 4D). Once the milling has been completed the post-core was adjusted to eliminate the connection sprues. The Zirconia post-core was then sintered at 1500°C for 8 hours and airborne particle abrasion with Al2O3 applied to the post-core surfaces for treatment.

Cementation
The base and catalyst of a silicone disclosing agent (Fit Checker, GC, USA) was mixed and applied to the post and cores surfaces in order to evaluate the proper fit of the one-piece post core system into the post space. The post-core system was placed in the root canal. The disclosing agent around the post and core surfaces were evaluated for any pressure spot contacts upon removal from the root canal. No adjustments were needed. It was assured that the post was fully seated in the mouth and the occlusion was verified by placing the existing crown on the core. Then the cementation procedure of the post-core system was performed with a dual-polymerizing resin cement following the manufacturer’s instructions (Panavia F2.0, Kuraray, Osaka-Japan). A primer (Metal/zirconia Primer, Kuraray, Osaka-Japan) was applied to the post-core surfaces of the zirconia before cementation. Then a self-etching and autopolymerizing dentin primer was mixed in a 1:1 mixing ratio and applied to the root dentin surfaces. The cement was mixed and applied to the post surface with a brush and to the root with the aid of a lentulo. The post-core was cemented using finger pressure and excess cement was removed using microbrushes followed by light polymerization applied for 20 seconds on each surface (Bluephase LED curing unit; Ivoclar Vivadent, Schaan-Liechtenstein) (Figure 3C). The existing crown restoration was then cemented onto the post (Figure 3D). The treatment provided a satisfactory result to meet the functional and esthetic requirements of the patient.
Discussion

The amount of remaining coronal dentin has utmost importance on the choice of an appropriate reconstruction procedure for endodontically treated teeth. If less than one-half of the coronal tooth structure is remaining on a pulpless tooth, it is usually advisable to place a post and core, thereby providing adequate connection of the root structure to the coronal core. With such a wide variety of materials and post designs available for the restoration of endodontically treated teeth, the clinician should be selective in choosing the post-core system that best fits the individual needs of each case.

Sorensen and Engelman reported that the key factor in the failure threshold is coronal extension of the tooth structure above the crown margin. Researchers concluded that a ferrule height of at least 1.5 mm is required to ensure a favorable restoration prognosis. If the coronal tooth structure is severely damaged and not enough for the ferrule preparation or that leaves no coronal tooth structure then a weak root-post-core system will result. For such challenging cases, better predictable custom post and core systems treatment alternatives will result by preserving the maximum remaining sound tooth structure.

The most common failure of endodontically treated teeth restored with post and core system is the post loosening. Deciding for the most appropriate post and core alternative has an important impact on this failure rate. Srividya et al. reported that the root canal morphology of the tooth being restored should also be considered. In the case of narrow canals with adequate dentinal wall thickness, a prefabricated post provides the necessary retention and adaptation. However in some cases the root canals could anatomically be oval shaped rather than circular or the preparation of the canal during endodontic treatment may result in an oval form. If a prefabricated post is used in such cases, it will have to depend on the increased thickness of the cement for its retention. Grandini et al. and Valandro et al. reported that the polymerization stress, developing within a relatively thin film of cement, would be minimal and the formation of bubbles or voids, representing areas of weakness within the material, is less likely to occur in a thin layer of cement. It has been reported in former studies that an excessively thick layer of resin cement around a fiber post was an unfavorable factor for long-term success of post supported restorations and this might have some correlation to higher frequencies of post debonding. It is also another well established concept that a close canal adaptation with minimal tooth structure removal provides a conservative and long-lasting treatment for the restoration of endodontically treated teeth.

The restoration of endodontically treated teeth with metal-free, physiochemically homogeneous materials has become a major objective in dentistry. Christel et al. observed that prefabricated zirconia posts, introduced in the late 1980s, exhibited high flexural strength and fracture toughness; Kwiatkowski and Geller reported the ability of such posts to be silanated and bonded with a resin cement. Prefabricated zirconia posts have been used with pressed ceramics or adhesively luted composite resin as core materials. The first case report presented in this article describes a treatment procedure where a prefabricated zirconia post and heat pressed core is constructed for the patient taking into account the adequate sound tooth structure present and the need for the esthetic requirements in the anterior region. Prefabricated post-core systems have good mechanical and biocompatibility properties. They save time and they display ease of manipulation. However, their diameters cannot be customized to adapt to individual post space preparations. Furthermore, prefabricated post systems need a separate core, and the weak interface between the core and post may cause a higher restoration failure rate. Therefore, it is desirable to unify the post and core in one material for long-term stability. By decreasing the number of interfaces between components, the single unit restoration helps to achieve a monobloc effect. Alternatively, a one-piece post and core can provide good adaptation in the post space, as well as provide a structure that lacks a post-and-core interface.

The gold standard for custom made post-cores was the casting of the precious metal alloys in the past years. However, in contemporary prosthodontics, all ceramic crowns are progressively replacing the metal ceramic crowns in the anterior region. In this respect, while restoring an endodontically treated tooth with an all ceramic crown, it is also required to use an esthetic post system. Bitter et al. reported that one-piece zirconia posts and cores can be an alternative to cast gold posts and cores when a custom-fabricated post and core is necessary. The currently available CAD/CAM systems can use alumina or partially sintered zirconia, nanoceramic and fiber reinforced blocks to mill metal-free, one-piece post-cores.

A custom made one-piece zirconia post-core has been used as a treatment alternative in the second case report of the present article. Another important aspect of this option is that the post and core has been designed to match the patient’s existing crown. This method affords
the patient and clinician another treatment alternative in such challenging situations. The milled ceramic post and core is strong due to its one-piece construction and the milling of the resin pattern, that has been formed intraorally, using the CAD/CAM technology produces a restoration with an accurate fit.

**Conclusion**

Empirical evidence accumulated by experienced restorative and prosthodontic practitioners and judging from previous dental literature, a tentative clinical conclusion can be made considering the residual intact tooth structure and root configuration for the restoration of endodontically treated teeth. In most cases the use of prefabricated zirconia posts and one-piece post and cores have their own indications, as presented in detail in the two case reports of this article. The one-piece milled metal-free post-core assembly can serve as a viable option when a custom post and core is necessary to restore the tooth.

**Conflict of interests**

There is no conflict of interests.

**References**


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In 11 chapters and 1200 images, of the highest quality and resolution, featuring special 3d printing, the author describes in minute details how to use lithium disilicate by presenting clinical cases that he has worked on in co-operation with other world renown clinicians.

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Snoring and sleep apnea: what is the dentist’s role in the clinical practice process?
Part II

(Part I, CJRDP's Archives: www.cardp.ca - Vol.7-1, Spring, 2014)

Abstract

Since the publication of the first article related to snoring and sleep apnea in this paper, certain legislative changes emerged and significantly modified the interventions used to manage patients suffering from these health problems. In Quebec, amongst others, the Quebec College of Physicians published a practice guide for its members entitled: “Obstructive sleep apnea and other sleep related breathing disorders”

There is no doubt that other governmental authority jurisdictions in Canada will publish guidelines along those lines, if they have not already done so. In Quebec, again, the Quebec Order of Dentists plans to strictly supervise the treatment of sleep apnea by its members, but at the time this article was written, the impact of these future guidelines remained unknown.

The following article will briefly comment the changes made in the legislative framework by highlighting the impact they have in everyday clinical practice. Moreover, we will take a more detailed look at the different types of dental appliances available and used by dentists as well as their side effects and the principles underlying the management of complications that may arise.

The Quebec College of Physicians practice guide (QCP)

Over the last few years, the number of patients diagnosed and treated for sleep apnea substantially increased. Patient management standards, from one region to another, are irregular, and often, the way healthcare is organized gives us reason to suspect a potential conflict of interests. Consequently, from now on, there must be complete independence between the entity that makes the diagnosis and the entity that provides the treatment. A dentist can no longer conduct ambulatory sleep apnea treatments in his office, as with past practice. Similarly, a firm that sells CPAP appliances can no longer offer sleeping testing options to its clientele. Furthermore, it is no longer possible to have these tests interpreted outside of the province. The interpreting physician must meet certain qualifications, be licensed and have a valid practice address to see patients within the province of Quebec. In view of the short time that has elapsed since the publication of these guidelines, they might not fully be implemented. The dentist who wants to take part in treating sleep apnea and snoring must ensure that the sleep laboratory where he wants to refer his patients complies with QCP requirements.

The QCP also fairly accurately defined the dentist’s role: we have the power to identify patients suffering from sleep apnea and refer them to their family physician or a sleep laboratory. However, we cannot specify which tests are required to establish the diagnosis: this is the physician’s role, who must see the patient for consultation. We can also, upon a medical reference, treat the patient with a dental orthesis. An important thing to note: the dentist is the only professional recognized as qualified for this type of treatment. The document does not mention the denturists’ role. Discussions I have had with QCP representatives confirmed that this is not an omission: even if taking dental impressions and putting a dental orthesis intraorally is relatively easy, the follow-up, the potential dental complications and their management require knowledge that go beyond the denturists’ expertise.
Sleep Dentistry

The different types of dental appliances

There are currently more than a hundred appliances on the market to treat sleep apnea and snoring disorders. The intent of this article is not to inventory them, but present certain ranges of appliances and concepts that will allow the practitioner to select the most appropriate orthesis for an individual patient.

Dental orthosis operate under 3 action mechanisms:

Some will raise the soft palate and displace the tongue anteriorly. The Full Breath appliance, created by Dr Bryan Keriopian, is a prime example. (Figure 1)

This type of orthosis is rarely used, and no scientific literature demonstrates its efficiency, to my knowledge.3

Some will stabilize the tongue in an advanced position, with a suction mechanism. Many of these appliances are prefabricated and may be customized.4 These appliances are exclusively for complete denture wearers, people with a certain macroglossia and patients whose dental condition is too precarious for their teeth to serve as anchors for a more conventional appliance.5 (Figure 2)

This is without a doubt the most popular category of mandibular advancement orthosis. The action mechanism is quite simple: by maintaining the mandible in an advanced position, we create traction on the tongue and the soft tissues in the back of the mouth. We therefore open airways, which allows normal breathing.6 (Figure 3)

Personally, I classify mandibular advancement appliances in 3 sub-categories, according to the stabilization rigidity between the maxilla and the mandible. You will notice that I will not mention non-adjustable appliances: the efficiency of dental appliances will vary over time, according to different factors, such as the weight of the patient, his fatigue level, etc. Using a non-adjustable appliance greatly reduces his chance of success.

Some appliances offer a rigid link between the mandible and the maxilla: Silencer7 (Figure 4), TAP8 (Figure 5) and Kleerway9 (Figure 6) are excellent examples of this type of appliances.

According to my clinical experience, these appliances efficiently control sleep apnea disorders. However, the comfort level of the patient is the lowest. A recent study conducted by Gauthier et al.10 seems to reach the same conclusions. Intuitively, one could suspect that these appliances also generate more side effects. They are appropriate for severe cases and/or cases presenting excellent bone structures to anchor the orthosis.

The second category represents appliances with a semi-rigid link between the maxilla and the mandible. The control of the vertical dimension is less firm, but can be modulated by the use of interarch elastics. The efficiency of the appliance might be lessened, but the...
patient comfort level is increased, providing him greater freedom of movement. These appliances are appropriate for cases where the structural anchoring is compromised, for patients who have difficulty wearing a dental appliance as well as less severe cases. Narval CC\textsuperscript{11} (Figure 7), SUAD\textsuperscript{12} (Figure 8) and Herbst\textsuperscript{13} (Figure 9) are examples of this type of appliances.

Finally, the last class of mandibular advancement appliances is the one where the link between the maxilla and the mandible is more flexible. The pressure forces on the supportive structures are low, the patient comfort level is increased, but the pure efficiency of the appliance is compromised. These appliances are appropriate in cases where the patient wears a complete upper denture, in claustrophobia cases, less severe cases and cases where the appliance is used in a complementary manner with extensive dental restorations (complete rehabilitation).

Somnodent\textsuperscript{14} (Figure 10) and MicrO\textsubscript{2}\textsuperscript{15} (Figure 11) are excellent appliances in this class.

It is important to note that the global efficiency of the appliance is not always the most important factor. As explained in the following section, it depends on the initial diagnosis. For example, in a mild case, it is not always advisable, if we take into account patient comfort, to use the most efficient appliance available.

**Selection criteria for dental appliances**

With so many appliances at our disposal, how do we make a judicious choice?

We have to look at the characteristics of the case we want to treat according to the appliances that are available.

For example, for a patient presenting a severe apnea disorder, with excellent maxillary and mandibular bone structures, the cost of the therapy is a secondary factor. The selection you will make will differ from the appliance you would recommend to an elderly patient with arthritis (difficulty to adjust certain types of appliances), a complete upper denture and a severe apnea diagnosis.

Factors to be considered when selecting an appliance:

- Laboratory costs.
- Desirable life expectancy of the appliance: is it a try-out, a replacement for an existing appliance?
- Number and condition of teeth: is there sufficient dentition? (minimum 10 teeth per arch)
- Severity of the case: snoring only or severe apnea?
- Presence of comorbidity that could compromise the treatment fidelity: bruxism, restless legs syndrome, psychiatric troubles, arthritis.

By using an evaluation grid (Table 1), as the one proposed below (the name of the appliances is by way of indication only, the practitioner is free to use the appliances he wishes), we can easily offer our patient a
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selection of appliances that will suit his needs. To get maximum success with an appliance, the dentist who wants to take part in the treatment of snoring and sleep apnea disorders must be familiar with the particularities of several orthesis in order to offer the best solution possible to his patient.

Managing complications that may arise
Reference is often made to dental orthesis side effects. It is important to put the issue into proper perspective. Sleep apnea is a health issue that has significant impact on the patient’s health. In most cases, the dental impact of this type of treatment is lesser than its health benefits. When we evaluate the risks of infarction, CVA, high blood pressure, on an untreated patient suffering from sleep apnea, there is rarely sufficient justification to withhold an efficient dental treatment. The patient’s attending physician is the only one authorized to make this decision. A dentist who would suggests to his patient to stop using his appliance following dental complications (for example, a crown decimentation) would legally be held responsible, should the patient’s health subsequently decline. We would never recommend to a patient taking antidepressants for a serious medical reason to stop his medication following an increase of his caries rate. The same reasoning should also apply to mandible orthesis wearers.

Short term complications
Following the insertion of a mandible orthesis, the patient undergoes an acclimatisation period, which can cause: excess saliva or, inversely, excessive xerostomia during the night, muscular masticatory discomfort and tooth sensitivity. If these complications are diligently managed, we can minimize their extent.

On follow-up appointments, the practitioner must evaluate the tooth sensitivity level of the patient and reduce the strain on the supportive structures by adjusting the inside of the mandibular orthesis. The practitioner can also prescribe exercises to reduce muscular masticatory discomfort. These exercises consist of protrusion and retrusion movements using the handle of the denture toothbrush, for example, to guide the protrusive movement. The advantage of this technique is that the toothbrush used to clean the appliance also serves for the muscular relaxation exercises. (Figures 12 & 13) (Figures 14 & 15)

To minimize dental movements, a technique recommended by Amisleep (TAP appliances) consists in using the AM Aligner. This is simply a thermoplastic product wafer, molded on the teeth in a maximum intercuspidation position, which the patient bites, in the morning, after wearing his appliance. The goal is to restore the initial mandibular position, and it takes approximately 30 seconds to do so. (Figures 16 & 17)

Long term complications
On the long term, the most common complication is the presence of occlusal changes. This can take different
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forms: individual or massive teeth shifting, where the mandible will be considerably modified. These occlusal changes, which can appear over the course of several years, were arbitrarily classified as positive changes, such as the reduction of the horizontal overlap, neutral or negative changes, such as a vertical posterior open-bite or a unilateral cross-bite. The most recent published researches tend to demonstrate that these movements occur continuously, at different amplitudes, while the patient undergoes treatment.17

Interesting fact to know, dental appliances do not have monopoly on these dental movements. An article published a few years ago documents dental movements caused by the long term use of the CPAP18.

An interesting aspect of long term complications of dental orthesis is the following: even if there are occlusal changes, sometimes major, the prevalence of temporomandibular articulation disorders is not higher than it is in the general population19-20. Without wanting to stir up any controversy, we can ask ourselves, in light of these conclusions, if certain widespread beliefs about the temporomandibular articulation should be reconsidered.

Clinical case 1:
Miss Amy (fictitious name)
A 31 year old patient, diagnosed with hypothyroidism, numerous fatigue symptoms, (Epworth questionnaire, 12 on 24), morning headaches, important gain weight (15 kg over 2 years), mild sleep apnea (AHI to 4.6) and RDI (including awakenings) at 6.3. After using the evaluation grid (Table II), her options were the Narval or the Somnodent appliances, and she finally selected the latter.

When trying on her dental appliance, the patient received customary advice concerning its maintenance and morning exercises. Due to the severity of her symptoms, it was agreed to accelerate the activation process compared to the clinical protocol I usually follow. The patient must also meet with her physician to manage her hypothyroidism disorder, which could partially cause her fatigue.

At the first checkup, the patient reports the almost complete disappearance of her sleep apnea symptoms, but has developed moderate masticatory muscle pain and a possible posterior open-bite.

In view of this, we revised the morning exercise protocol and created a «Morning Repositioner» for her. The mandibular orthesis was also completely deactivated in order to allow her to get used to the appliance.

One month later, the TMJ symptoms were resolved, the correction of the open-bite was underway, but the sleep apnea symptoms returned with renewed strength. With the patient’s consent, we began the advancement process and revised the morning exercise protocol.
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Finally, at the last checkup, following the mandibular advancement, her fatigue disorders and headaches were diminishing, without any temporomandibular pain symptoms. The occlusion was improved, but the patient still had difficulty chewing certain foods. This situation is not painful. The patient prefers to live with a slightly altered occlusion, while being able to carry out her daily activities normally. It will be important in this case to rigorously follow her to ensure the occlusion doesn’t undergo significant changes.

Clinical case 2 : M. JD

To conclude, I will present the case of M. JD and illustrate unexpected complications that we can encounter when treating a mild case of sleep apnea. This case will also highlight the limits that a dentist can reach in his field of practice.

A 44 year old patient, police officer for 20 years.

- Main complaint of snoring and daytime fatigue.
- Excellent physical condition.
- Excellent supportive bone structures for a dental appliance.
- Presence of a complete crown on tooth 11 for about 10 years. The patient is informed of the decimentation risks, and we will choose an appliance that offers a mild link between the mandible and the maxilla to prevent overloading of the crown.
- The polysomnography reveals a normal IAH (less than 5 events per hour), and the patient was referred by a sleep specialist.

The case seems easy to treat, it is only a snoring case. (Figures 23 a-f)

During the treatment process, the patient reports the high efficiency of the appliance to eliminate his snoring disorders. The patient reports no pain nor occlusal changes. After a 3 month follow-up, the patient seems uneasy. He complains about having recurring nightmares and is now scared to wear his dental appliance.
Through questioning, we learned that during his career, this police officer was exposed to numerous dangerous situations with possible loss of human life. His nightmares could be related to his work.

As dentists, at this point, we have reached the limits in our field of practice. The patient (according to the sleep specialist) seems to be suffering from some kind of post-traumatic stress, and modifying his sleep architecture with a dental appliance now allows him to reach the REM sleep stages, where the nightmares occur. We improved the quality of his sleep architecture, but that lead to another condition affecting the patient, the presence of night terrors, unknowingly.

In view of this, the patient was re-evaluated and treated by the sleep specialist. It could be tempting for an ill-advised dentist to interrupt the dental therapy. However, the physician is the only one who can do the cost-benefit analysis before taking such a decision. From the patient’s point of view, it is more likely preferable for him to be treated for his psychiatric complications: he will feel better on a long term basis. Legally, we can question ourselves on the potential repercussions resulting from a treatment without prior diagnosis by a physician. What would have happened if the patient or his surrounding circles suffered from detrimental consequences related to his newly emerged nightmares? In the event of a lawsuit, who would have been held responsible? Would the situation be covered by the practitioner’s indemnity insurance, if the treatment process was not scrupulously followed?

While this type of case may seem rare, we frequently see a patient with mild sleep apnea or snoring suffer from other sleep disorders, explaining in part his symptomatology. The presence of a qualified medical team, working in collaboration, allows us to provide the best care possible.

As I attempted to demonstrate in these few lines, the dentist who wants to take part in treating sleep apnea and snoring disorders must first link up with sleep laboratories in his area and ensure that they comply with applicable requirements.

The collaboration of a high quality medical team is the most important success factor for this type of treatment. Taking dental impressions and putting a dental orthesis intraorally is relatively easy. With experience and the right training, learning to choose dental appliances, follow-up with patients and manage complications should go smoothly. Good luck.

Conflict of interests
There is no conflict of interests.

References for this article can be accessed on page 74

About the author
Dr. David Côté obtained his Doctorate in Dental Medicine from U de Montréal in 1996. He established a private practice in Gatineau. Ever since, Dr. Côté has been interested in the treatment of snoring and sleep apnea using dental devices. Dr. Côté is a member of the American Academy of Dental Sleep Medicine, a representative of the American Board of Dental Sleep Medicine and founding member of the dental section of the Canadian Sleep Society. He works, notably, in collaboration with the Outaouais Neuro Clinic and Ottawa Hospital, overseeing the treatment of sleep apnea.
Ronflement et Apnée du sommeil: quel est le rôle du dentiste généraliste dans le processus de prise en charge en pratique? 
Partie II

(R partie I, Archives JCDRP: www.cardp.ca - Vol.7-1, printemps, 2014)

Résumé
Depuis la publication du premier article traitant de ronflement et d’apnée du sommeil dans ce journal, certains changements législatifs sont survenus et ont modifié sensiblement la prise en charge des patients souffrant de ces troubles de santé. Au Québec entre autres, le Collège des Médecins du Québec a publié un guide d’exercice à l’attention de ses membres intitulé : «Apnée obstructive du sommeil et autres troubles respiratoires du sommeil»1 Il ne fait aucun doute que les autorités d’autres juridictions au Canada publieront des directives allant dans la même direction, si ce n’est déjà fait. Au Québec toujours, l’Ordre des Dentistes du Québec envisage d’encadrer plus formellement le traitement de l’apnée du sommeil par ses membres, mais au moment d’écrire ces lignes, l’impact de ces futures lignes directrices demeure inconnu.

L’article qui suit commentera brièvement les changements au cadre législatif en faisant ressortir leur impact sur la pratique de tous les jours. Aussi, nous verrons plus en détail les différents types d’appareils dentaires disponibles et utilisés par les dentistes, leurs effets secondaires et les principes guidant la prise en charge des complications possibles.

Le Guide d’exercice du Collège des Médecins du Québec (CMQ)

Depuis quelques années, le nombre de patients diagnostiqués et traités pour des troubles d’apnée du sommeil a considérablement augmenté. Les standards de prise en charge des patients, d’une région à l’autre était très inégal et souvent l’organisation des soins laissait suspecter une situation de potentiel conflit d’intérêt. En conséquence, il doit désormais y avoir une indépendance complète entre l’entité qui fait le diagnostic et l’entité qui prodigue le traitement. Un dentiste ne peut plus faire passer des tests du sommeil ambulatoires dans son bureau, comme cela se faisait autrefois. De même, une firme qui vend des appareils CPAP ne peut plus offrir de tests de sommeil à sa clientèle. De plus, il n’est plus possible de faire interpréter ces tests hors de la province. Le médecin interprétant doit avoir certaines qualifications, détenir un permis d’exercice et une adresse de pratique valide pour recevoir les patients à l’intérieur de la province de Québec. Étant donné le peu de temps qui s’est écoulé depuis la publication de ces directives, il est possible qu’elles ne soient pas encore complètement mises en place. Le dentiste qui veut s’impliquer dans le traitement de l’apnée du sommeil et du ronflement a tout intérêt à s’assurer que le laboratoire du sommeil où il veut référer ses patient se conforme aux exigences du CMQ.

Le CMQ a aussi défini de façon assez précise le rôle du dentiste : nous avons le pouvoir de dépister les patients souffrant d’apnée du sommeil et pouvons les référer soit à leur médecin de famille ou à un laboratoire du sommeil, pour prise en charge. Toutefois, nous ne pouvons spécifier quels tests sont nécessaires pour établir le diagnostic : c’est le rôle du médecin qui verra,
obligatoirement, le patient en consultation. Nous pouvons aussi, suite à une référence médicale, traiter le patient à l’aide d’une orthèse dentaire. Fait important à noter : le dentiste est le seul professionnel dont les compétences sont reconnues pour ce type de traitement. Le document ne fait aucunement mention du rôle des denturologistes dans la prise en charge de patients souffrant de troubles de ronflement et d’apnée du sommeil. Les discussions que j’ai eues avec les représentants du CMQ m’ont confirmé que ce n’est pas un oubli : bien qu’il soit relativement facile de prendre des empreintes et de mettre en bouche une orthèse dentaire, le suivi, le potentiel de complication dentaire et leur gestion demande des connaissances qui sortent du champ de compétence des denturologistes.

Les différents types d’appareils dentaires : 
Il existe à l’heure actuelle plus d’une centaine d’appareil mis sur le marché pour traiter l’apnée du sommeil et le ronflement. Le but de cet article n’est pas d’en faire l’inventaire, mais de présenter certaines familles d’appareils et certains concepts qui permettront au praticien de sélectionner l’orthèse qui sera la plus appropriée pour un patient donné.

Les orthèses dentaires fonctionnent selon 3 mécanismes d’action :

Certains vont soulever le palais mou et forcer la langue dans une position antérieure. L’appareil Full Breath, inventé par le Dr Bryan Keriopian, en est un excellent exemple. (Figure 1) 
Ce type d’orthèse est peu utilisé et il n’y a pas de littérature scientifique démontrant son efficacité, à ma connaissance. 

Certains vont stabiliser la langue dans une position avancée, par un mécanisme de succion. Il y a un bon nombre de ces appareils qui viennent sous une forme préfabriquée et il est aussi possible d’en faire confectionner sur mesure. Ces appareils sont réservés aux porteurs de prothèse complète, aux gens présentant une certaine macroglossie et aux patients dont la condition dentaire est trop précaire pour que les dents puissent servir d’ancrage à un appareil plus conventionnel. (Figure 2) 
La catégorie d’appareil la plus populaire est sans contredit celle des appareils d’avancement mandibulaire. Leur mécanisme d’action est assez simple : en maintenant la mandibule en position avancée, on crée une traction sur la langue et sur les tissus mous du fond de la bouche. On dégage ainsi le passage de l’air, permettant le maintien d’une respiration normale. (Figure 3) 
Personnellement, je classe les appareils d’avancement mandibulaire dans 3 sous-catégories,
selon la rigidité du lien de stabilisation entre le maxillaire et la mandibule. Vous noterez que je ne ferai pas mention d’appareils non ajustables : l’efficacité des appareils dentaires varie dans le temps selon plusieurs facteurs, dont les changements de poids du patient, le niveau de fatigue, etc... En utilisant un appareil ne permettant pas d’ajustement, on limite grandement ses chances de succès.

Il y a les appareils offrant un lien rigide entre la mandibule et le maxillaire : le Silencer7 (Figure 4), le TAP8 (Figure 5), et Kleerway9 (Figure 6) sont d’excellents exemples de ce type d’appareil.

Selon mon expérience clinique, ces appareils sont très efficaces pour contrôler les troubles d’apnée du sommeil. Toutefois, leur niveau de confort pour les patients est plus bas. Une étude récente de Gauthier et al.10 semble arriver aux mêmes conclusions. Intuitivement, on peut suspecter que les appareils de cette classe génèrent aussi plus d’effets secondaires. Ces appareils sont tout indiqués pour traiter des cas plus sévères et/ou des cas présentant d’excellentes structures permettant l’ancrage de l’orthèse.

La seconde catégorie représente les appareils avec un lien semi rigide entre le maxillaire et la mandibule. Le contrôle de la dimension verticale est moins ferme, mais peut être modulé par l’utilisation d’élastiques inter-arches. L’efficacité de l’appareil pourrait s’en trouver diminuée mais le niveau de confort pour le patient est augmenté par la plus grande liberté de mouvement pour le patient. Ces appareils sont tout indiqués dans les cas où les structures d’ancrage sont compromises, pour les patients qui ont plus de misère à porter un appareil dentaire et aussi pour les cas un peu moins sévères. Le Narval CC11 (Figure 7), l’appareil SUAD12 (Figure 8), le Herbst13 (Figure 9), sont des exemples d’appareil de ce type.

Finalement la dernière classe d’appareils d’avancement mandibulaire est celle où le lien entre le maxillaire et la mandibule est plus flexible. Les forces exercées sur les structures de support sont plus faibles, le confort est augmenté, mais l’efficacité pure de l’appareil est aussi compromise. Ces appareils sont indiqués dans les cas où le patient porte une prothèse complète supérieure, dans les cas de claustrophobie, dans les cas plus légers et dans les cas où on voudrait ménager des restaurations dentaires extensives (réhabilitation complète).

L’appareil Somnodent14 (Figure 10), et le MicroO215 (Figure 11) sont d’excellents appareils de cette classe.

Il est important de noter que l’efficacité globale de l’appareil n’est pas toujours le facteur le plus important. Comme il sera expliqué dans la section suivante, tout dépend du diagnostic de départ. Par exemple, dans un cas léger, il n’est pas toujours souhaitable, si on tient
compte du confort du patient, d’utiliser l’appareil le plus efficace disponible.

Principes de sélection des appareils dentaires
Avec tant d’appareils à notre disposition, comment procéder à une sélection judicieuse?

Il s’agit alors de regarder les caractéristiques du cas qu’on se propose de traiter en fonction des appareils qui nous sont disponibles.

Par exemple, vous recevez un patient présentant un cas d’apnée sévère, avec d’excellentes structures dentaires à la mandibule et au maxillaire, les coûts de la thérapie sont un facteur secondaire. La sélection d’appareil que vous ferez ne sera pas la même que pour un patient âgé, présentant des troubles d’arthrite (difficulté à ajuster certains types d’appareils), une prothèse dentaire complète du haut et un diagnostic d’apnée sévère.

Parmis les facteurs à considérer dans la sélection d’appareil :
• Coût des frais de laboratoires
• Durée de vie souhaitée de l’appareil : veut-on faire un essai, est-ce un remplacement d’appareil existant?
• Nombre et état des dents présentes : Avons-nous suffisamment de dents présentes? (minimum 10 dents par arcade)
• Sévérité du cas : ronflement seulement ou apnée sévère?
• Présence de co-morbidité pouvant compromettre la fidélité au traitement : bruxisme, Syndrome des jambes sans repos, troubles psychiatriques, présence d’arthrite

En utilisant une grille d’analyse (Table 1) telle que celle proposée ci bas, (le nom des appareils n’est présent qu’à titre indicatif, le praticien est libre d’utiliser les appareils qui lui semblent bon), on peut assez facilement proposer à son patient un choix d’appareil qui répondra à ses besoins.16

Afin d’atteindre un niveau de succès élevé avec l’utilisation de ce type d’appareils, le dentiste désirant s’impliquer dans le traitement du ronflement et de l’apnée du sommeil doit se familiariser avec les particularités de plusieurs orthèses pour être en mesure d’offrir à ses patients celle qui lui conviendra le mieux.

Prise en charge des complications
On entend souvent parler des effets secondaires causés par les orthèses dentaires. Il est important à ce point de remettre les choses en perspective. L’apnée du sommeil est un problème de santé aux conséquences très importantes sur la santé du patient. Dans la très grande majorité des cas, l’impact dentaire de ce type de traitement est beaucoup moindre que ses bénéfices sur la santé. Lorsqu’on regarde les risques d’infarctus, d’ACV, de haute pression, chez un patient non-traité souffrant d’apnée du sommeil, il y a rarement une justification suffisante pour interrompre un traitement par appareil dentaire qui est efficace. Seul le médecin traitant peut prendre une telle décision. Un dentiste qui conseillerait

<table>
<thead>
<tr>
<th>Table 1 : Grille d’analyse pour le choix d’appareils</th>
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<tbody>
<tr>
<td>Appareil</td>
</tr>
<tr>
<td>coût</td>
</tr>
<tr>
<td>Support disponible</td>
</tr>
<tr>
<td>confort</td>
</tr>
<tr>
<td>Habiléité du patient</td>
</tr>
<tr>
<td>Sévérité du cas</td>
</tr>
<tr>
<td>Durée de vie</td>
</tr>
<tr>
<td>autre</td>
</tr>
</tbody>
</table>
à son patient de cesser d’utiliser son appareil suite à des complications dentaires (par exemple, une couronne qui se décimente,) serait tenu légalement responsable si l’état de santé dudit patient venait à se dégrader par la suite. Jamais on ne conseillerait à un patient prenant des antis dépresseurs pour une raison médicale sérieuse de cesser sa médication suite à l’augmentation de son taux de carie. Le même raisonnement doit s’appliquer pour les porteurs d’orthèse mandibulaire.

Complications à court terme :
Suite à l’insertion d’une orthèse mandibulaire, le patient passe par une phase d’acclimatation au traitement qui peut se traduire par : un excès marqué de salive ou à l’inverse une xérostomie plus marquée la nuit, de l’inconfort au niveau des muscles de la mastication et de la sensibilité au niveau de certaines dents. Si ces complications sont prises en charge de façon diligente, on peut en minimiser la portée.

Lors des rendez-vous de suivi, le praticien doit évaluer le niveau de sensibilité au niveau des dents et atténuer la pression sur les structures de support en ajustant l’intérieur de l’orthèse mandibulaire. Le praticien peut aussi prescrire des exercices pour permettre au patient de réduire l’inconfort des muscles de la mastication. Ces exercices consistent à faire des mouvements de protrusion et rétrusion en utilisant le manche d’une brosse à prothèse, par exemple, comme guide du mouvement protrusif. L’avantage de cette technique est que la brosse à dent utilisée pour nettoyer l’appareil sert aussi pour les exercices de relaxation musculaire. (Figures 12 & 13) (Figures 14 & 15)

Pour minimiser les mouvements dentaires, une technique pronée par le manufacturier Amisleep (appareils TAP) consiste à utiliser le AM Aligner. C’est simplement une gaufrette de produit thermo-plastique, moulée sur les dents en position d’inter-cuspidation maximale, sur laquelle le patient mord, le matin, après avoir porté son appareil. Le but est de ramener la mandibule à sa position initiale et le tout dure une trentaine de secondes tout au plus. (Figures 16 & 17)

Complications à long terme.
A long terme, la complication la plus courante est la présence de changements occlusaux. Cela peut cependant prendre plusieurs formes : certaines dents individuelles peuvent se déplacer mais il peut aussi y avoir des mouvements de masse, où la position mandibulaire sera considérablement modifiée. Ces changements occlusaux, qui apparaissent sur une période s’échelonnant sur plusieurs années, ont été arbitrairement classés en changements positifs, telle une réduction du surplomb horizontal, neutres ou négatifs, telle l’apparition d’une béance verticale.
postérieure ou l’apparition d’un articulé croisé. Les dernières recherches publiées tendent à démontrer que ces mouvements se produisent de façon continue, à différentes amplitudes, tant que le patient sera sous traitement.\textsuperscript{17}

Fait intéressant à noter, les appareils dentaires n’ont pas le monopole de ces mouvements dentaires. Un article publié il y a quelques années documente les mouvements dentaires occasionnés par le port à long terme du CPAP\textsuperscript{18}.

Un aspect intéressant des complications à long terme des orthèses dentaires est le suivant : bien qu’on se retrouve en présence de changements occlusaux parfois majeurs, la prévalence de troubles de l’articulation temporo-mandibulaire n’est pas plus élevée chez les porteurs d’orthèse mandibulaire que dans la population en général\textsuperscript{19-20}. Sans vouloir relancer dans ces pages une nouvelle polémique, on peut se demander, à la lumière de ces conclusions, si certaines des croyances répandues au sujet des troubles de l’articulation temporo-mandibulaire n’auraient pas besoin d’êtres reconsidérées.

**Cas clinique 1 Mlle Amy (nom fictif)**

Patiente de 31 ans, diagnostic d’hypothyroïdie, beaucoup de symptômes de fatigue (questionnaire Epworth à 12 sur 24), céphalées matinales, prise de poids marquée (15kg sur 2 ans) et diagnostic d’apnée du sommeil léger (AHI à 4.6) et RDI (incluant les éveils) à 6.3. Suite à l’utilisation de la grille d’analyse (Table II), on arrive à offrir à la patiente le choix entre un appareil Narval ou Somnodent, qu’elle va finalement choisir.

Lors de la mise en bouche, les conseils d’usage liés à l’entretien de l’appareil et aux exercices matinaux ont été revus avec la patiente. Dû à la sévérité des symptômes, il a été convenu d’accélérer le processus d’activation par rapport au protocole clinique que je suis habituellement. La patiente doit aussi voir son médecin.

**Table II – Grille d’analyse pour le cas clinique, Mlle Amy (nom fictif)**

<table>
<thead>
<tr>
<th>Appareil</th>
<th>Somnodent</th>
<th>Narval</th>
<th>SUAD</th>
<th>Kleerway</th>
<th>TRD</th>
<th>Autre</th>
</tr>
</thead>
<tbody>
<tr>
<td>coût</td>
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<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Support disponible</td>
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<td>OK</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>confort</td>
<td>parfait</td>
<td>OK</td>
<td>OK</td>
<td>Pas indiqué</td>
<td>Non indiqué</td>
<td></td>
</tr>
<tr>
<td>Habiléité du patient</td>
<td>parfait</td>
<td>parfait</td>
<td>OK</td>
<td></td>
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<tr>
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<td>parfait</td>
<td>OK</td>
<td>OK</td>
<td>OK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Durée de vie</td>
<td>parfait</td>
<td>parfait</td>
<td>parfait</td>
<td>parfait</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>
Figures 23 a-f — Cas clinique M. JD après 7 mois de traitements avec l’Appareil Somnodent : a) vue frontale; b) vue latérale droite; c) vue latérale gauche; d-e) appareil Somnodent; f) Appareil d’avancement Somnodent en bouche

de famille pour prendre en charge ses troubles d’hypothyroïdie, qui pourraient être partiellement en cause pour les troubles de fatigue.

Au premier rendez-vous de contrôle, la patiente rapporte une résolution presque complète des symptômes liés à l’apnée du sommeil, mais elle a développé une douleur modérée aux muscles de mastication et une béance semble vouloir s’installer en région postérieure. Devant cette situation, nous avons revisé le protocole d’exercices matinaux et avons confectionné pour la patiente un «Morning Repositionner». L’orthèse mandibulaire a aussi été complètement désactivée pour laisser une chance à la patiente de s’acclimater à l’appareil. (Figures 18-22)

Au suivi 1 mois plus tard, les symptômes à l’ATM étaient résolus, la béance était en voie de se corrigir, mais les symptômes liés à l’apnée étaient revenus en force. Avec le consentement de la patiente, nous avons repris le processus d’avancement et avons revu le protocole matinal d’exercices.

Finalement, au dernier rendez-vous de contrôle, suite à l’avancement, les troubles de fatigue et de céphalée étaient en voie de se résorber sans que les symptômes de douleur temporo mandibulaire soient présents. L’occlusion s’est améliorée, mais la patiente ressent toujours un peu de difficulté à mastiquer certains aliments. Cette situation n’est pas douloureuse. La patiente préfère vivre avec une occlusion légèrement altérée, mais pouvoir mener ses activités quotidiennes de façon normale. Il sera très important dans ce cas de suivre la patiente rigoureusement pour s’assurer que l’occlusion ne se modifie pas davantage.

Cas clinique 2 : M.JD

Pour terminer, le cas de M. JD sera présenté et illustrera les complications inattendues qu’il est possible de rencontrer lors du traitement d’un cas léger d’apnée du sommeil. Ce cas mettra aussi en relief les limites que le dentiste peut atteindre dans son champ de pratique.

Patient de 44 ans, policier depuis 20 ans,
• Plaîtée principale de ronflement et de fatigue diurne.
• Excellente condition physique.
• Excellentes structures de support pour un appareil dentaire.
• Présence sur la dent 11 d’une couronne complète datant d’environ 10 ans. Le patient est averti des risques de décémentation et la sélection d’un appareil ayant un lien faible entre la mandibule et le maxillaire sera faite pour éviter de surcharger la couronne.
• La polysomnographie révèle un IAH normal (moins de 5 événements à l’heure) et le patient est référé au cabinet par un spécialiste du sommeil.
• Le cas semble bien facile à traiter, on a affaire à un cas de «ronflement seulement».
(Figures 23 a-f)

Au cours du processus de traitement, le patient rapporte la très grande efficacité de l’appareil à régler ses troubles de ronflement. Le patient ne rapporte
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Editor’s Note :
In order to access the extensive Bibliography of Dr. Dennis Nimchuk’s recent article : A New Paradigm For Creating Durable Occlusal Precision With Indirect Bondable Ceramic, CJRDP, Vol.7, No 3, Fall, 2014, please visit www.cardp.ca, Journal Section, and download the online Digital version, page 61.

Note de l’éditeur :
aucune douleur ou de changements occlusaux. Après 3 mois de suivi, au rendez-vous de contrôle, le patient semble mal à l’aise. Le patient se plaint de cauchemars répétitifs et à maintenant peur de porter son appareil dentaire. Au fil du questionnement, nous apprenons que durant sa carrière, ce policier fut exposé à plusieurs situations périlleuses impliquant possiblement des pertes de vies. Les cauchemars qu’il vit pourraient être liés à son métier.

Comme dentiste, à ce point, nous avons atteint les limites de notre champ de pratique. Le patient (selon le spécialiste du sommeil) semble souffrir d’une certaine forme de stress post-traumatique et le fait de modifier l’architecture du sommeil par le port de l’appareil pourraît être un facteur de réussite avec les règles les régissant. La collaboration avec une équipe médicale qualifiée, travaillant en collaboration, permet d’améliorer la qualité de l’architecture du sommeil du patient, mais cela a aussi fait ressortir une autre condition qui affligait le patient, la présence de terreurs nocturnes, à son insu. Devant cette situation, le patient fut retourné au spécialiste du sommeil pour réévaluation et prise en charge. Il serait tentant pour un dentiste mal avisé d’interrompre la thérapie par appareil dentaire. Toutefois, seul le médecin traitant peut faire le calcul coût-bénéfice qui s’impose avant de prendre une telle décision. Du point de vue du patient, il est probablement préférable que ses complications psychiatriques soient traitées : il s’en portera mieux à long terme. Au niveau légal, on peut se questionner sur les répercussions qui pourraient découler d’un traitement sans diagnostic préalable de la part d’un médecin. Que serait-il arrivé si le patient ou son entourage avaient subi des conséquences fâcheuses liées aux cauchemars nouvellement apparus? En cas de poursuite, qui aurait été responsable? L’assurance responsabilité du praticien aurait-elle couvert cette situation, si le processus de traitement n’était pas scrutulemement suivi. Bien que ce type de cas puisse sembler rare, il est très fréquent qu’un patient souffrant d’apnée légère ou de ronflement souffre aussi d’autres troubles du sommeil, expliquant en partie sa symptomatologie. La présence d’une équipe médicale qualifiée, travaillant en collaboration, permet alors d’offrir les meilleurs soins.

En conclusion, il est préférable que ses complications psychiatriques soient traitées : il s’en portera mieux à long terme. Au niveau légal, on peut se questionner sur les répercussions qui pourraient découler d’un traitement sans diagnostic préalable de la part d’un médecin. Que serait-il arrivé si le patient ou son entourage avaient subi des conséquences fâcheuses liées aux cauchemars nouvellement apparus? En cas de poursuite, qui aurait été responsable? L’assurance responsabilité du praticien aurait-elle couvert cette situation, si le processus de traitement n’était pas scrutulemement suivi. Bien que ce type de cas puisse sembler rare, il est très fréquent qu’un patient souffrant d’apnée légère ou de ronflement souffre aussi d’autres troubles du sommeil, expliquant en partie sa symptomatologie. La présence d’une équipe médicale qualifiée, travaillant en collaboration, permet alors d’offrir les meilleurs soins.

Aucun conflit d’intérêt rapporté

A propos de l’auteur

Dr David Côté a obtenu son doctorat en Médecine Dentaire de l’Université de Montréal en 1996. Il est établi en pratique privée à Gatineau depuis 1998. Dès sa graduation, Dr Côté s’est intéressé au traitement du ronflement et de l’apnée du sommeil à l’aide d’appareils dentaires. Dr Côté est membre de l’Academy of Dental Sleep Medicine, il est Diplomate de l’American Board of Dental Sleep Medicine et membre fondateur de la section Dentaire de la Canadian Sleep Society. Il travaille notamment en collaboration avec la clinique Neuro Outaouais et avec l’hôpital d’Ottawa dans le traitement de l’apnée du sommeil.
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Welcome Our Incoming President
Bienvenue à notre nouveau Président, Dr. Ian Tester

Dr. Tester graduated from the University of Toronto with a DDS in 1982 and received a Master in Dental Sciences from Donau University in Krems Austria in 2004, with major emphasis on the treatment of the complicated patient using Orthodontics, Prosthetic Dentistry, physical therapy and medical intervention.

He now practices general dentistry in St. Catharines, Ontario with a focus on multidisciplinary treatment of the complex patient. He is a member of many professional and educational organizations in the United States and Canada and is a past President of the International Dental Study Club and a Fellow of the Canadian Academy of Restorative Dentistry and Prosthodontics, the American College of Dentists, the International College of Dentists, the Pierre Fouchard Society and the Academy of Dentistry International. He is a founding member of the International Academy of Advanced Definitive Dentistry (IAADD) and is section co-editor of the CJRDP in Occlusion and Temporomandibular Dysfunction.

Dr. Tester lectures in the U.S. and Canada on the topics of TMD, Function, Dysfunction, Esthetics and Occlusion in Restorative Dentistry. In addition, he is mentor to the Niagara Peninsula Dental Diagnostic Study Club.

He and his wife Nancy have six adult children and enjoy their time off relaxing at their cottage on Lake Huron, cycling and playing golf.

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Academy News / Nouvelles de l’Académie

President’s message / Message du président

The 23rd Annual Scientific Meeting of the Canadian Academy of Restorative Dentistry and Prosthodontics (CARDP) will be held at the Hotel Intercontinental (Front Street) in Toronto on October 1-3rd, 2015. As President, it is my pleasure to extend a personal invitation to you to attend and experience our unique blend of superb continuing education, camaraderie and social events.

As befits the preeminent Canadian Dental organization promoting excellence and education in Restorative Dentistry and Prosthodontics our organizing committee has designed an outstanding and diverse program that will include a hands-on component for members on Thursday, five world class speakers on Friday as well as fourteen leading clinicians addressing clinically relevant topics on Saturday. The educational program is well balanced with our social events ensuring a fantastic weekend.

CARDP is proud of our history and the continued dedication of our members to the art and science of Restorative Dentistry and Prosthodontics. It is our mission to promote excellence in all aspects of our personal and professional lives. We are committed to the highest standards of professional ethics and are leaders in promoting unbiased, outstanding continuing education. Our academy journal (The Canadian Journal of Restorative Dentistry and Prosthodontics – CJRDP) is peer-reviewed and read nationwide. Conference information as well as digital back issues of our journal can be viewed on our website www.cardp.ca.

We look forward to seeing you in Toronto October 1-3rd, 2015.

Sincerely,
Ian W. Tester DDS, MSc
CARDP President

L’ACDRP est fière de notre histoire et du dévouement continu de nos membres à l’art et à la science de la dentisterie restauratrice et de prosthodontie. Notre mission est de promouvoir l’excellence dans tous les aspects de nos vies personnelles et professionnelles. Nous avons pris l’engagement de mener nos activités en fonction des normes professionnelles et éthiques les plus rigoureuses et sommes leaders en matière de formation continue impartiale et d’exception. Le journal de l’académie (le journal canadien de dentisterie restauratrice et de prosthodontie – JCDRP) est révisé par des pairs et lu à l’échelle du pays. Vous pouvez obtenir plus d’information sur les conférences et consultez les éditions numériques précédentes de notre publication sur notre site Web, à l’adresse www.cardp.ca.

Au plaisir de vous rencontrer à Toronto du 1er au 3 octobre, 2015.

Veuillez agréer mes salutations distinguées,
Ian W. Tester DDS, MSc
Président de l’ACDRP
The organizing committee for CARDP Toronto 2015 is pleased to announce this preliminary program. The theme for the meeting is “Inspiring Excellence” and the program has been designed to provide a diverse number of topics relevant to Restorative/Prosthodontic Practice. The program format will include a Thursday “Hands On” program open to members. The Friday Essayists include world-class speakers and the revised Saturday Clinics will include a full day of leading clinicians speaking on a variety of clinically relevant topics.

THURSDAY — Hands-on all day
U of Toronto CE Teaching Facility, Don Mills

FRIDAY Essay Program:

1. Terry Donovan, DDS
   Professor and Section Head for Biomaterials, Department of Operative Dentistry at the University of North Carolina School of Dentistry at Chapel Hill
   "Clinical Analysis of Contemporary Ceramic Systems"

2. Glen Johnson, DDS, MS
   University of Washington, Dept. of Restorative Dentistry
   "New Dental Adhesives and Crown Cements – What should you use and why?"

3. Carlo Ercoli, DDS
   University of Rochester Medical Centre
   "Complex implant reconstructions: surgical and prosthetic perspectives."

4. Basil Mizrahi, BDS, MSc, Med
   Diplomate, American Board of Prosthodontics
   "Getting more out of your temporary crowns. Advanced techniques to allow you to enhance the function of temporary crowns and let them aid you in the treatment of complex cases."

5. Van B. Haywood, DMD
   Professor, Department of Oral Rehabilitation, College of Dental Medicine GC
   "Tooth Bleaching Techniques: The pre-bleaching exam and single dark teeth."

6. Kim Kutsch, DDS
   "Dental Caries: A Disease of Choice?"

SATURDAY 20 Minutes Presentations:

1. Uche Odiatu, DDS
   "Exercise is Medicine: The right Rx for the dental professional"

2. Kristina Perschbacher, BSc, DDS, MSc, (Oral Med. and Pathology), FRCD(C)
   "White Lesions: Hyperkeratosis to Carcinoma"

3. Susanne Perschbacher DDS, MSc, (Oral Radiology), FRCD(C)
   "Panoramic radiographic interpretation: Making sense of the shadows"

4. David Psutka, DDS, FRCD(C) (Oral Surgery)
   "TMJ Surgery. State of the Art and Science."

5. Peter Fritz, B.Sc., DDS., FRCD(C) (Oral Surgery)
   "Supportive Implant Therapy: A Step By Step Protocol To Maintaining Implants."

6. Oliver Pin Harry, DDS, MS, (Prosth) FRCD(C)
   "Short Implants: Scientific Rationale and Clinic Applications"

7. Michelle Lee, DMD, MSD, (Perio.) FRCD(C), FCDS (BC)
   "Surgical Strategies to Manage the Labially Positioned Dental Implant."

8. Izchak Barzilay, DDS, MS, (Prosth.) FRCD(C)
   "Wide body implants – what are they good for?"

9. Nancy Dubois DDS, (Prosth.), FRCD(C)
   "Treatment Planning for the Obstructive Sleep Apnea Patient: What you should know."

10. Brent Winnett DDS, (Prosth.)
    "Screw vs. Cement-retained Implant Prosthodontics: the Practical Reality"
ACDRP Toronto 2015
Hôtel Intercontinental (rue Front)
Congrès annuel scientifique du 1er au 3 octobre 2015

« Inspirer l’excellence »


JEUDI – Volet pratique toute la journée
(Université de Toronto, établissement d’éducation continue, Don Mills)

<table>
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<th>Basil Mizrahi, BDS, MSc, Méd.</th>
<th>Diplomate agréé, American Board of Prosthodontics</th>
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<td>« Tirez le meilleur parti de vos couronnes temporaires. Des techniques de pointe pour améliorer la fonction de vos couronnes temporaires dans le cadre de cas complexes. »</td>
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VENDREDI – Dissertations

1. Terry Donovan, DDS
   Professeur et Chef de la section des biomatériaux, Département de Dentisterie opératoire, Faculté de Médecine dentaire de l’Université de la Caroline du Nord, à Chapel Hill
   « Analyse clinique des systèmes de céramique contemporains. »

2. Glen Johnson, DDS, MS
   Université de Washington, Département de dentisterie restauratrice
   « Les nouveaux adhésifs et ciments pour couronnes dentaires – Ce que vous devriez utiliser et pourquoi? »

3. Carlo Ercoli, DDS
   Centre médical de l’Université de Rochester
   « Les reconstructions d’implants complexes : perspectives chirurgicales et prothétiques. »

4. Basil Mizrahi, BDS, MSc, Med
   Diplomate agréé, American Board of Prosthodontics
   « Obtenir de bons résultats esthétiques et biomécaniques avec des prothèses fixes. Défis et solutions. »

5. Van B. Haywood, DMD
   Professeur, Département de réhabilitation buccale, Collège de médecine dentaire GC
   « Techniques de blanchiment dentaire : l’examen préblanchiment et les dents individuelles de couleur foncée. »

6. Kim Kutsch, DDS
   « Caries dentaires : une maladie de choix? »

SAMEDI – Présentations de 20 minutes

1. Uche Odiatu, DDS
   « L’exercice est la médecine : le bon Rx pour le professionnel dentaire. »

2. Kristina Perschbacher BSc, DDS, MSc, (Méd. orale et pathologie), FRCD(C)
   Lésions blanches : de l’hyperkératose au carcinome. »

3. Susanne Perschbacher DDS, MSc, (Radiologie orale), FRCD(C)
   « L’interprétation d’une radiographie panoramique : comprendre les ombres. »

4. David Psutka, DDS, FRCD(C)
   (Chirurgie orale)
   « Chirurgie de l’ATM. Technologies de pointe et science. »

5. Peter Fritz, B.Sc., DDS., FRCD(C)
   (Ph.D. (Paro.)
   « Thérapie implantaire : un protocole étape par étape pour maintenir des implants. »

6. Oliver Pin Harry, DDS, MS, (Prosth) FRCD(C)
   Mini-implants dentaires : justification scientifique et applications cliniques. »

7. Michelle Lee, DMD, MSD, (Paro.) FRCD(C), FCDs (BC)
   « Stratégies chirurgicales pour gérer un implant dentaire positionné labialement. »

8. Issch Barzilay, DDS, MS, (Prosth.) FRCD(C), Présidente de l’ APC
   « Implants à corps larges : à quoi servent-ils? »

9. Nancy Dubois DDS, (Prosth.), FRCD(C)
   « Planification d’un traitement pour un patient souffrant d’apnée du sommeil obstructive : que devriez-vous savoir? »

10. Brent Winnett DDS, (Prosth.)
    « Implants prosthodontiques vissés ou scellés : la réalité pratique. »

POUR PLUS D’INFORMATION ET POUR S’INSCRIRE:
WWW.CARDP.CA

Academy News / Nouvelles de l’Académie

CARDP Annual Meeting / Congrès annuel de l’ACDRP
Montréal – 2014

More photos – Plus de photos: www.cardp.ca
Peacefully, from Pancreatic Cancer on Monday, September 22, 2014 our CARDP family lost a wonderful friend, and the dental community lost a keen supporter, that through his many efforts made our profession better. Paul Rotsaert followed the tradition of support of continuing dental education begun by his father Henri Rotsaert through Rotsaert Dental Laboratory. His passion for life and his ongoing curiosity will be missed by all of us that were privileged to call him a friend.

Born to Henri and Simone Rotsaert on November 20, 1958 Paul, along with his siblings Nicole, Mark, Eric and Peter shared fabulous family vacations in Oliphant, Ontario, trips to Belgium and many ski trips together. Paul learned to sail at an early age and was an active member of the Hamilton Golf and Country Club and The Royal Hamilton Yacht Club for many years. In 1984, he was an instrumental part of a team that built three Mazza II International 14 wooden sailboats on the ground floor of Rotsaert’s Dental Lab (the Emerald Street Boatworks). The boat building team was awarded the Hudson’s Bay trophy by the club that year. His love of water continued as his favourite passion (fishing) took him on many wonderful trips. As his pancreatic cancer gradually took its toll, fishing offered Paul peace and an opportunity to be outdoors which he dearly loved.

Paul graduated from the University of Guelph with an Honours B.Sc. in Microbiology (1982). He returned to Hamilton and began working as a researcher at McMaster studying cancer. In 1983 he joined Rotsaert Dental Laboratory Services, eventually assuming the role of President. Paul received his Registered Dental Technologist (RDT) designation in 1992. Subsequently, he continued his education with many world leaders of Dentistry including Dr. Terry Tanaka, Mr. Willi Geller, Dr. Rudolph Slavicek, Dr. Martin Mai, Mr. Russell DeVrught and Dr. Peter Dawson. Paul became a lecturer at the University of Buffalo (SUNY) in fixed partial dentures (1996-1997) and was a well-respected speaker at many Academy meetings, study clubs and symposiums throughout his career. In addition, he was a long time director of Cal-Lab, an International Association of Dental Laboratories. His expertise was evident as an editorial board member of the CJRDP in Dental Technology. As president of Rotsaert Dental Laboratory his dedication to excellence in every aspect of Dental Technology ensured worldwide recognition of the quality of work produced. Paul acted as a kind, patient mentor to countless dentists and technicians.

Paul was always a source of information. He had an amazing ability to recall seemingly endless details that he somehow managed to coalesce into solutions. His library was large and he read insatiably. There was no shortage of inventions, ideas and discussions about how to improve everything from the simplest concept to the most complex problem. 3D printers, virtual imaging, digital technology etc. were part of Paul’s everyday thoughts and future designs. In 1990 Paul spent two months in Lyon, France studying CAD/CAM systems with pioneer, Dr. Francois Duret. This education became a wonderful foundation for his desire to keep Rotsaert’s at the leading edge of innovation in technology.

Paul and Judy Rotsaert were married in 1986. Subsequently, they moved to Ancaster, Ontario where they raised their two sons, Tyler and Michael. Paul and Judy where blessed with a special relationship that truly expressed their deep love for each other. It was a privilege to spend time with these two amazing people who complemented one another so completely. As a father, Paul imparted his love of outdoor sports and his passion for life to his two sons. He was a keen supporter of their individual dreams and nothing gave him more joy and pride than to share in their many accomplishments. Paul was a humble, kind and compassionate friend who will be remembered for having always been there for all of us.

In the words of Ralph Waldo Emerson:

Do not go where the path may lead,
go instead where there is no path and leave a trail.

Paul left a beautiful trail that has influenced all of us in so many positive ways. Thank you Paul for sharing your path. You have inspired much in all of us. May you rest in peace.

---

Ian W. Tester DDS, MSc - President CARDP 2014-2015
Call for Papers

CARDP's Executive Board has concluded a publishing agreement with Palmeri Publishing Inc. The Academy's Journal (CJRDP/JCDRP) is published four times a year since 2008 with a circulation of 7,000 up to 13,000. The 2015 Journal Production Schedule is accessible at http://www.cardp.ca/sitedocs/2015%20CJRDP%20Production%20Schedule.pdf

Scientific articles are Peer Reviewed. The Journal welcomes article contributions from its members, guest dentists and dental technologists as well as the dental Industry.

Editor-in-chief: Dr. Hubert Gaucher
Associate Editors: Drs. Maureen Andrea, Emo Rajczak and Dennis Nimchuk
Section Editors: Drs. Kim Parlett, Ian Tester, Ron Zokol, Yvan Fortin, Paresh Shah, Izchak Barzilay, Peter Walford, Allan Coopersmith and Mr. Paul Rotsaert
Academic Liaison: Dr. Peter Taylor

I - Scientific Articles: (Original Research Studies, Reviews, Case Reports): Please refer to these “Instructions to Authors” for details. www.cardp.ca/sitedocs/CJRDP-Guidelines-PP1-PR1.pdf%2002-12.pdf

For Case Reports please review this information: http://www.cardp.ca/sitedocs/CJRDP-Case-Report-Authors.pdf

II - Member News: Please forward any news of interest to the Profession.

III - Young Authors Awards Fund: Financial contributions to this fund will recognize a dentist with 5 years’ experience or less or a graduate student in Canada, with a $1,000 award for the best published article of the year.

IV - Dental Student Award Fund: Financial contributions to this fund will recognize a dental student in Canada, who will receive a $500 award for the best published article of the year.

V - Industry News and Product Profile Articles: New dental products, technologies and Industry services are presented to readers using articles that originate from the Industry and that are identified as such. This information is contained in the above “Instructions to Authors” and in the following Journal Media Kit: http://www.cardp.ca/sitedocs/MediaKit-2015-email.pdf

If you have comments or suggestions about submissions or would like to become more involved with the Journal, please contact the Editor-in-Chief:

Dr. Hubert Gaucher
hgaucher@sympatico.ca
Tel: (418) 658-9210
Fax: (418) 658-5393

Demande de communications


Les articles scientifiques font l’objet d’une revue par des pairs. Le Journal accueille des articles de ses membres, de dentistes et prothésistes dentaires invités ainsi que de l’Industrie dentaire.

Rédacteur en chef: Dr Hubert Gaucher
Rédacteurs associés: Drs Maureen Andrea, Emo Rajczak et Dennis Nimchuk
Rédacteurs de sections: Drs Kim Parlett, Ron Zokol, Yvan Fortin, Paresh Shah, Izchak Barzilay, Peter Walford, Allan Coopersmith et M. Paul Rotsaert
Liaison académique: Dr. Peter Taylor


Pour le Rapport de cas, veuillez consulter le document suivant: http://www.cardp.ca/sitedocs/CJRDP-Case-Report-Authors.pdf

II – Nouvelles des membres: S.V.P nous envoyer toute information pertinente à la profession.

III – Bourse pour les jeunes auteurs: Les contributions financières permettront de remettre une bourse de 1 000$ à un dentiste ayant moins de cinq ans de pratique et/ou à un(e) étudiant(e) diplômé(e) au Canada pour le meilleur article publié au cours de l’année.

IV – Bourses pour étudiant(e) en Médecine dentaire: Les contributions financières permettront de remettre une bourse de 500$ à un étudiant ou étudiante en Médecine dentaire au Canada pour le meilleur article publié au cours de l’année.


Si vous avez des commentaires ou des suggestions ou si vous désirez vous impliquer davantage dans notre Journal, veuillez communiquer avec le Rédacteur en chef:

Dr Hubert Gaucher
hgaucher@sympatico.ca
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