James Campbell-Wilson Oration 2014

Delivered by Dr John C. Winters

Now if Alistair was here to speak for himself this evening I'm sure he would have opened his oration with a joke. I'm afraid I don't have his artful way of telling and getting away with ribald jokes, but I am going to tell you about four doctors who went on a duck hunt.

There was a physician, a psychiatrist, a surgeon, and a pathologist. They had just been through a process of accreditation and so were very aware of the importance of quality and safety, and the need for proper patient identification before a procedure. For safety's sake, they agreed to shoot one at a time. First up was the physician. A duck flew up from the reeds on the edge of the lake. The physician raised his gun, took aim, and followed the flight of the duck, but then he lowered his gun without firing a shot. He turned to the other doctors and said "it looked like a duck, it quacked like a duck, but I just couldn't be sure that it was a duck". Next up was the psychiatrist. Within seconds another duck broke cover. The psychiatrist raised his gun, took aim, followed the flight of the duck, but then he too lowered his gun, turned to the other doctors and said "it looked like a duck, it quacked like a duck, but I just don't think that it identified as a duck". Then the surgeon moved forward as another duck took flight. Without hesitation, the surgeon smoothly raised his gun and fired off a shot, bringing down the bird in a mass of feathers. He turned to the pathologist beside him and said “go and check if that was a duck”.

The Campbell-Wilson Roll of Honour was established in 1995 by the University of Western Australia's Dental Alumni Society to recognise and honour those individuals who have made a significant contribution to the dental profession in Western Australia, particularly for contributions to dental education at an undergraduate or postgraduate level in the WA School of Dentistry. I have read through the Campbell-Wilson roll of honour, and on it, I can find the names of many of my favourite teachers and mentors. People who have profoundly shaped my professional knowledge, attitudes and practice. With the well-deserved induction of Dr Alistair Devlin this evening, the actual Roll of Honour has now outgrown its original board. This must surely be a reflection of the quality of dental educators and dental education at our
University.

At the time that Jimmy Campbell-Wilson presided over the Dental Board of Western Australia, the condition we now refer to as “pregnancy gingivitis” was often called pyorrhea alveolaris, and it would have been easy to find a consensus amongst reputable dental practitioners of the time, that the best treatment was a full clearance and dentures. In fact the general attitude towards oral health at that time, was that teeth were a burden, best extracted and replaced with dentures at the earliest opportunity. This was reflected in a public attitude of the day that a bride to be should have a full clearance and dentures, so as not to be a burden on her prospective husband. While we may be horrified at many levels, to hear of such attitudes today, this gift was dutifully bestowed by my maternal grandfather on my eldest three aunts, a family tradition that was only stopped by my mother’s stubborn refusal to participate. These days of course we are far more enlightened, and we would recognise the edentulous condition to be a “chronic titanium deficiency”. By the time I entered dental school these “blood and vulcanite” attitudes had changed, but it is only through education that new knowledge can be disseminated and old knowledge re-evaluated, to shape clinical practice so that eventually public attitudes will change. Despite this, much of what I learned in dental school has also turned out to be wrong.

I was taught that we would never be able to bond composite resin to dentine. Not that it hadn't been done yet, but that it couldn't be done, because of the high organic content and moisture levels in dentine. Thirty years later, we all routinely carry out dentine bonding everyday. I was taught the importance of extension for prevention. When Gordon Christiansen published his seminal work on preventive resin restorations he was sneeringly dismissed as the "pot-hole dentist". It took a long time to recognise that the "extension for prevention" could be achieved with the fissure sealant rather than the burr, but the philosophy underpinning this new technique was eventually incorporated into the framework of minimal intervention dentistry. In the era of “blade” and “sub-periosteal” implants, I was taught that all implants were doomed to failure because bone could not stick to metal and that the trans-mucosal connectors would let in germs from the mouth. Clearly at the time, my lecturers were unaware that on the other side of the planet an orthopaedic surgeon in Sweden was having trouble
prising loose the titanium view ports he was using to do some basic research into bone biology. This is what Nassim Taleb would refer to as a "Black Swan". A highly improbable event that does not conform to our long experience. An event that was inconsistent with expert opinion, and the best evidence of the day, but which has the potential to radically reshape our clinical practice. I had great teachers, but the nature of science is that we constantly question and reassess our knowledge. We constantly have to navigate the shifting sands of the best available evidence.

One of the big debates that raged when I was an undergraduate was the “specific” versus “non-specific” plaque hypothesis. Since its promulgation in 1890, Miller's non-specific plaque hypothesis observed that more plaque meant more disease. With the benefit of advances in microbiological techniques, this was challenged in 1979 by Loesche, who postulated the specific plaque hypothesis. In my periodontology tutorials, Rob Bower explained that juvenile periodontitis occurred in the presence of minimal plaque, but was a specific infection with the wonderfully named Actinobacillus actinomycetemcomitans. At the time, it was still impossible to culture, let alone identify most of the oral microflora, and DNA fingerprinting of microorganisms was not even science fiction let alone science fact.

The specific plaque hypothesis also had a profound impact on cariology. All of a sudden, dental caries, and in particular Early Childhood Caries was explained in the terms of a specific infection with Streptococcus mutans. There was a proliferation of research correlating the number of Streptococcus mutans with the number of holes in children's teeth, correlating Streptococcus mutans counts in parents and their children, and finally matching the serotypes and even DNA fingerprints of Streptococcus mutans between parents, carers, and their caries riddled children, seeking to prove that decay is an infectious disease. Even today, it is possible to enrol in courses explaining how to manage dental caries as an infectious disease. The impact of this on our public health teaching was profound and alarming. Parents were being told by dental authorities that they should not kiss their children for fear of infecting them with tooth decay. Parents were told that they should not taste the child's food lest it become contaminated with their own decay germs thereby passing the infection from one generation to the next. While research efforts pursued an elusive caries vaccine, we were trained to
apply chlorhexidine varnish to children’s teeth to stop those nasty germs in their tracks.

Correlation however, is not causation. Daniel Kahneman explains in his excellent book “Thinking, Fast and Slow” that human brains are organised to see patterns, even where no pattern exists. This is why we are so unprepared for the Black Swan events. The new discovery or the re-evaluation of knowledge that will overturn a contemporary paradigm that shapes the way we perceive the world.

Let me veer away from dentistry for a moment. Every summer here in Perth we will hear a news story about our beleaguered Swan and Canning rivers suffering yet another algal bloom. A well spoken marine biologist will patiently explain that there is an ecological disturbance. Farms and tree clearance in the river catchment cause too much nutrient inflow from fertiliser run-off, and as the seasonal flow of the river slows in summer, the water stagnates and warms, causing an overgrowth of algae. Oxygen levels fall and fish die. A variety of engineering solutions are always proposed that will include less fertiliser, more stable fertiliser, replanting trees, installing nutrient leaching ponds, deep ripping the farmland to divert water flows away from the river, and aeration of the stagnant water to improve oxygen levels, break up the algae, and reduce fish kills. The algal bloom however, is never described as an infection with algae. There is never any discussion of curing an algal bloom by poisoning the algae with algaecide.

In his 1991 PhD thesis Marsh developed the “ecological” plaque hypothesis as an alternative to the specific and non-specific plaque hypotheses, and our understanding of plaque has fundamentally changed. No longer is plaque considered to be structureless and amorphous layer of slime, where more is bad and less is good, nor is it considered to be a specific infection with a specific germ. Plaque is now recognised to be a “biofilm” with a subtle and intricate ultrastructure demonstrating ecological interdependencies as complex as those found in a coral reef. Microorganisms have chains of co-dependency, they signal to each other, they modulate the host immune response, and are affected by chemical and hormonal changes in the oral environment. Pregnancy gingivitis is now seen to be an ecological shift in the plaque where a hormonal growth factor causes an overgrowth of pathogenic
organisms such as Prevotella intermedia and Porphyromonas gingivalis, that will resolve as the host hormonal levels stabilise post partum, and is certainly no longer considered to be an indication for a dental clearance.

Dental caries can also be seen as an ecological disturbance, in which excessive nutrient inflow, in the form of sugar and cooked or processed starches, causes a population shift in the oral microflora such that the acid tolerant, facultative anaerobes such as our old friend Streptococcus mutans come to dominate the oral microflora in a process more akin to an algal bloom than an infection. Dental caries is the result of an imbalance between demineralisation and re-mineralisation. Rather than scaring parents about germs and tell them not to kiss their children, we need to teach them about the facts. That’s FACTSS. The Frequency, Amount, and Contact Time of Sugars and cooked Starches.

Despite improvements in our population dmf scores, even today, half of all children will have a cavity before they get to school. At PMH, emergency dental extractions for relief of pain reach a peak at the tender age of five years. Although the population mean for five year olds is less than two decayed, missing or filled teeth, the worst 10% of preschool children averages half their teeth rotten, and five percent of preschoolers have acute pain from their carious teeth. Eighty percent of Early Childhood Caries in four year olds remains untreated. When it comes to Early Childhood Caries, even now, the nihilism that affected our approach to adult dentistry in the first half of last century, which led to so many unnecessary dental extractions, still affects the public and professional mindset towards management of the primary dentition. On the basis of conventional dental treatment provided for children under the British NHS, Tickle and Milsom postulated in 2002 that it was a waste of time restoring baby teeth. Their conclusion can be paraphrased as “let them rot and fallout if they don’t hurt, and pull them out if they do”. Does that sound familiar?

In contrast to this, there is prolific evidence that restorative treatment for the primary dentition carried out under general anaesthetic produces consistently higher technical quality and more durable restorations with fewer re-treatments than the standard clinical techniques assessed by Tickle and Milsom. Not only that, there is a significant improvement in quality of life outcomes when Early
Childhood Caries is comprehensively treated under general anaesthetic. In 1999, Acs showed that children with Early Childhood Caries fail to thrive, but simply by restoring their teeth, their growth curves caught up to their caries free peers. Why should treatment under general anaesthetic be so much more successful? Well there are the obvious things like being still, keeping the mouth open, and not being terrified during treatment, but there are the less obvious things, subtle changes in the way treatment is planned under anaesthetic. Things that are taught during postgraduate training in Paediatric Dentistry. With a Complete Oral Rehabilitation under General Anaesthetic for Early Childhood Caries the aim is to go beyond just filling the holes, and to integrate preventive care. What my mentor Peter Gregory would have called “shutting the gate”. Shocking the oral ecosystem into a new caries stable equilibrium.

It is an odd little fact that I grew up in Karrinyup just one street back from Alistair’s dental surgery on Burroughs Road. I used to walk right past there every school day on my way to the bus transfer station in the Karrinyup shopping centre. As a kid, I was vaguely aware that the old house on the corner had been converted into a dental clinic, and they used to do full anaesthetics there. At the time that meant nothing to me, but when I met Alistair as an adult doing my children’s dentistry units at the dental school and at PMH, I was struck, not just by the caring way he treated children, but by the way he lead me to understand that general anaesthesia was not a behaviour management strategy, but a way of uncoupling the need to treat a child’s dental problems and their behaviour at the same. It was not something to be avoided at all costs, but rather for selected cases it was a safe and effective component of an integrated management strategy for children’s oral health.

Advances in anaesthetic drugs, techniques, and intraoperative monitoring lead by the Australian and New Zealand College of Anaesthetists have taken general anaesthesia from an iffy, hazardous unpredictable technique, to a safe and effective technique for facilitating all forms of surgical treatment. In fact Australia and New Zealand are the safest places in the world to have an anaesthetic, and amongst children, dental treatment is the third most common reason for having an anaesthetic.

So who is accessing general anaesthetic care? Children from high
socioeconomic groups where wisdom tooth problems seem to be over represented are certainly accessing anaesthetic care, but dental caries is concentrated in the low socioeconomic groups where structural and financial barriers limit access to anaesthetic services. Many rural hospitals simply don’t treat little kids, because of minimum age and minimum weight limits. The Commonwealth Dental Benefit Scheme specifically excludes dental treatment under general anaesthetic, so it systematically disadvantages the youngest children and the children with the highest disease burden who would benefit from getting some financial support for dental treatment under general anaesthesia. What a poor execution of an otherwise great idea. Furthermore, there is an arcane code called the AR-DRG. The Australian Refined Diagnosis Related Groups is supposed to categorise hospital treatment into groups with similar conditions and similar usage of hospital resources for funding purposes. Under this system, the one code D40Z covers all "dental extractions and restorations", so a 15 minute “quick snatch” single extraction and a four hour slog with a Special Needs case, trying hard to avoid an extraction, get the same code and the same weighting, the same funding and the same hospital rebate. This perverse “economic driver” makes dental treatment unprofitable and therefore undesirable to hospitals, making it hard for dental patients to access hospital services across the board. While this has been identified as an issue to be addressed by the new National Oral Health Plan, the stratification of dental cases will take time, and I fully expect will be opposed by the powerful private health insurance lobby.

I have been working with the Health Department of WA to develop a scheme that aims to improve access to comprehensive oral health care in rural and low socioeconomic Western Australian preschool aged children – an identified gap in services. Based on what I call the “Christmas Island model” my aim is to develop an integrated oral health care model providing early assessment and preventive care, minimal intervention therapy, conventional restorative treatment and where necessary, Complete Oral Rehabilitation under General Anaesthetic by visiting specialist teams. Unfortunately, despite successful outcomes in the pilot phase, in the current contractionary fiscal environment, the scheme has been effectively shelved. Its just baby teeth.

So how do we change attitudes? How do we keep up with the paradigm shifts that transform our understanding of the world? The Black Swan
events? From Alistair’s exemplary professional life I would like to offer two themes. One, is the active engagement with ongoing continuing education, and two, the maintenance of professional networks by active involvement with professional organisations. Over the years, Alistair played a front-line role in undergraduate education as a part-time tutor, and for two periods, in the mid-90s, and during the last years of his life, he was the coordinator for the undergraduate program in Paediatric Dentistry. This was a role he clearly relished. He was loved by the students he taught, and they awarded him an Honorary Life Membership of the WA Dental Student’s Society. For most people, that would be enough, but for Alistair there was always more to do. He was actively involved in University Continuing Dental Education Committee, the Australian Society of Endodontology, and where I knew him best, the Australian and New Zealand Society of Paediatric Dentistry in which he was a founding member, organiser, agitator, and secretary-for-life! It was with great pleasure and the universal acclamation of the ANZSPD membership that I awarded Alistair an honorary life membership of ANZSPD in 2007. Alistair’s contributions are also honoured in the “Alistair Devlin ANZSPD WA Branch Prize in Paediatric Dentistry” awarded to the undergraduate student with the highest mark in paediatric dentistry, and “The ANZSPD Alistair Devlin Memorial Grant”, for a range of child oral health related projects. Details can be found on the ANZSPD website at anzspd.org.au.

Alistair was actively involved with the Dental Alumni Society and the establishment of the Western Australian Dental Foundation in 2001. He is honoured in yet another prestigious award, the “WA Dental Foundation, Alistair Devlin Memorial Scholarship” funded by his family, colleagues and friends through the Western Australian Dental Foundation to honour and acknowledge his passion and lifelong work in paediatric dentistry at The University of Western Australia. The scholarship is provided to encourage and assist a student in their final year of the degree of Doctor of Clinical Dentistry, in the specialist area of Paediatric Dentistry, to travel to an international institution to further their study experience and add value to their achievements.

Now, to the Noongar people, whom I acknowledge as the traditional custodians of the land we share, the Black Swan which is the central metaphor of Talib's book was common knowledge and hardly the unexpected surprise that it was for the colonising Europeans. Whether
an event catches you unawares depends on your point of view and the extent of your global communication network. For me, I had a Black Swan moment just last week. I have been working through Princess Margaret Hospital with boys affected by X linked Hypohydrotic ectodermal dysplasia for nearly 30 years. This is a rare orphan disease that causes a range of symptoms including lack of sweat glands, poor temperature control, respiratory problems, and hair and tooth malformations. For a dentist, the most spectacular manifestations are the unusual conical teeth, oligodontia, lack of alveolar bone, and atypical facial development. I had always assumed that being a genetic condition it was essentially incurable. A chance remark by Peter Gregory concerning the use of the new ANZSPD website to communicate with our membership, alerted me to a clinical trial in which a recombinant ectodysplasin molecule administered in the neonatal period may have the potential to normalise development of the affected tissues. This is something I may not have heard about were it not for my active involvement in ANZSPD. That is, without my professional network. It was here that Alastair truly excelled. His ability to develop and maintain professional networks like ANZSPD and the Dental Alumni Society was remarkable. Networks that benefit us all where we can share ideas and perhaps even affect political change. Alistair truly deserves his induction onto the Campbell-Wilson roll of honour. Thank you.

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