



# The Future Is Here

Advancements in facial, oral and dental technology begin at Imperial Dental Specialist Centre.

While many of us fear dentists and avoid the necessary bi-annual dental consultation, oral check-ups remain one of the most important appointments to keep. Apart from diagnosing and treating common dental discrepancies, along with offering advice on how to maintain healthy teeth and gums to avoid future problems, dentists also have the capabilities of providing smiles that stop people right in their tracks. Apart from treating tooth decay, filling cavities and straightening teeth, oral practitioners have entered the realm of maxillofacial surgery and can now offer

solutions that don't require invasive procedures, while providing better results.

The Imperial Dental Specialist Centre (IDSC) understands patient needs well. As advocates for tailored techniques based on individual needs, this award-winning dental facility has every solution to help patients regain not only a functional oral cavity, but also a stunning one. To find out about the unique problems and cases IDSC treats, we seek out four of its doctors who reveal how problems come to be, and how easily they are fixed.





## Invisalign with Consultant Orthodontist, Dato' Dr. How Kim Chuan

In reference to the photos attached, this patient presented with Class 3 malocclusion where the lower jaw protrudes forward. Furthermore, she also suffered severe dental crowding in both the upper and lower arches. Following an extraction of the four premolars, we conducted an Invisalign 3D planning, utilising accurate digital software. As you can see, we were able to not only correct this patient's Class 3 malocclusion, but also address the dental crowding.

There are many patients in South East Asia who present with Class 3 related problems, with or without crowding. Likewise, many people also believe that lower jaw protrusion can only be rectified with jaw surgery. This is because even with orthodontic treatment, patients may still be left with 'witch-like' appearances, where the chins protrude, and faces sink in.

What we want to prove is that with Invisalign coupled with extraction, doctors are able to retract the teeth inward, and move the chin and lower jaw to optimal positions. Therefore, Invisalign isn't just a basic appliance which treats simple malocclusions. In fact, it has unmatched positioning effects that don't simply straighten teeth, but also improve a patient's skeletal profile and facial silhouette.

Finally, it must be emphasised that Invisalign's ClinCheck movement predictions are extremely accurate. Even before treatments have begun, patients would already have a view of their end results. In other words, what you see is what you get. Moreover, if patients remain disciplined and ensure they wear their appliances for at least 22 hours daily, results can be achieved much quicker than Invisalign's traditional orthodontic counterpart. In my opinion, Invisalign's Digital Orthodontic Alignment System is the future of modern orthodontics because treatment processes are less painful, more efficient, and offer superior results.

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Clincheck is a 3D digital technology that is able to move teeth on a 1:1 ratio. This is expressed accurately in the mouth.



The optimal aesthetic line is when the tip of the nose, upper lip, lower lip and chin fall into a straight line. Notice that before Invisalign treatment, the lower lip and chin exceeds the line. After treatment, the lower lip and chin are corrected.



The arch form usually dictates facial balance. By symmetrising the arch form, we can correct facial asymmetry.



Pictures courtesy of Dato' Dr. How Kim Chuan.





## Smile Design with Consultant Orthodontist, Dato' Dr. How Kim Chuan

As you can see, this patient presented with a unilateral crossbite on the left corner, affecting in facial asymmetry where the chin deviates when the patient smiles. Before further treatment was advocated, we recommended that she undergo Invisalign treatment to centralise the teeth's midline, which corrected her facial asymmetry.

Looking at the images, you may also discern that the patient had previously undergone composite veneers prior to treatment. Following crossbite correction, we proceeded with replacing the composite with zirconium veneers. Finally, we also addressed her gummy smile through an amalgamation of both Invisalign to intrude the teeth, and laser gingivalplasty to aesthetically contour her gums.

Unlike composites, zirconium veneers are milled utilising 3D printing technology. Likewise, they offer more natural colour payoffs, and aren't susceptible to staining, despite nicotine and caffeine intake. Composite veneers, however, are opaque, and have the tendency to discolour not only the teeth, but gums too. Last but not least, zirconium veneers are ultra-long-lasting, resulting in less instances of fractures or damage.

Because zirconium veneers are designed through smile design software, patients can similarly enjoy optimal smile designs based on the laws of Golden Proportions. If patients aren't in the know, the concept of Golden Proportions – where the smaller teeth is about 62 percent the size of larger ones – has often been offered as the cornerstone of smile design theory. Considering the many plusses zirconium veneers provide, it's no wonder why they're considered the Bentleys of aesthetic dental prosthetics. As such, it shouldn't be a surprise that its only disadvantage is a slightly costlier price tag.



*Pictures courtesy of Dato' Dr. How Kim Chuan.*



**Before treatment: Midline has shifted to the left due to unilateral crossbite. This has also caused the jaw to skew to the left side, resulting in facial asymmetry.**



**After Invisalign treatment, we changed this patient's composite veneers to zirconia veneers. Notice the translucent surface which exhibits the material's lively appearance and glow, even in the dark.**



**Before treatment, this patient underwent composite veneers. Find the skewed midline, poor margins and dull shades. Following Invisalign treatment, the midline and unilateral crossbite was corrected after just six months.**



## Dental appearances among children with Consultant Dentist, Datin Dr. Alice Wong

### Two Rows Of Teeth

There are instances where a child's permanent teeth have appeared, but his or her baby teeth haven't exfoliated. This means that the child presents with two concomitant rows of teeth. Normally, a permanent tooth rises just below the root of the neonillus tooth, causing it to absorb its root and give it mobility. Conversely, if the permanent tooth rises somewhere else – commonly behind the neonillus tooth – the baby teeth may not become mobile or exfoliate naturally.

This is of concern, but parents needn't worry as the phenomenon is common, and rarely poses problems. If the neonatal teeth move, or are loose when permanent teeth come in, dentists may just wait and see if the baby teeth fall off. If the neonatal tooth does not move at all when the permanent teeth have risen to the same height, then dentists can proceed with extractions of the baby tooth. While there shouldn't be any reason to worry, I do recommend consultations or expert advice sooner than later.

### Paediatric Bruxism

Should you worry if your seven-year-old is grinding his or her teeth? Tooth grinding – or bruxism – is common when baby teeth begin to emerge and when permanent teeth are



The ugly duckling stage.

coming in. While dentists aren't a hundred percent sure why grinding takes place, we do understand that oral discomfort can be caused by dental shifting and realignment, causing temporary bruxism, as well as allergies, and other minor illnesses.

While paediatric bruxism normally resolves on its own, parents can help alleviate problems by following these simple steps. Firstly, work to identify and decrease your children's stress by allowing them to openly talk about their feelings. Secondly, be sure to advocate proper, healthy diets. Lastly, since dehydration has been linked to grinding, ensure that your child is drinking enough water.

### The Ugly Duckling Stage

Have you ever noticed that your child's teeth are irregularly spaced, with an apparent gap on the left and right sides of his or her front teeth? This can be caused by permanent canines that are in their eruptive stages. This phenomenon is absolutely normal, and is a self-correcting anomaly, known as the Ugly Duckling Stage. Usually seen in the mixed dentition period, the indication will resolve as soon as the canines erupt or when the child reaches 12 years of age. If the condition persists, then medical intervention is necessary. Such treatments may include split labial bows, elastic threads or composite build up on the mesial sides of the incisors.

Pictures courtesy of Dato' Dr. Hoay Kim Chinan.



Two rows of teeth.



Paediatric bruxism.





## Minimally invasive dental extractions with Dr. David Tan

Severely decayed or impacted teeth are some of the reasons for dental surgical removal. Where the wisdom teeth are concerned, there are instances where the tooth is hidden underneath gums and bones, affecting tooth movement during orthodontic treatment. If wisdom teeth erupt in improper positions, symptoms may include toothaches and unpleasant smells, especially if food is constantly stuck in between teeth and gums. Furthermore, cavity formation is very likely if plaque is left untreated for extended periods.

The term 'minimally invasive surgery' is described as procedures which require minimal cutting or utilising of instruments to penetrate the patient's soft or hard tissues. With modern technology, instrumentation, and minimally invasive surgical techniques, patients enjoy faster healing, with the added advantages of decreased post-operative swelling and pain.

Cone beam CT scans (CBCT) have significantly changed the way dentists practice their craft. It provides us with three-dimensional images of teeth and their supporting structures, allowing correct diagnosis, and of course, appropriate treatments forms that are much safer and more precise.

### Types of Surgery

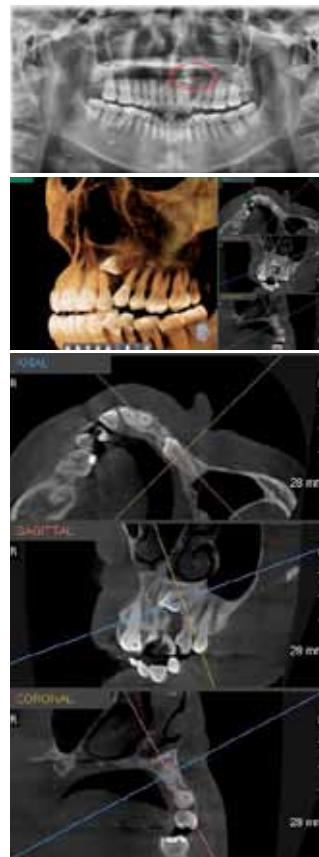
**Third molar surgery:** CBCT scans provide dentists with exact positions of the impacted third molars, including their relationship with sensory nerves, sinuses and other neighbouring vital structures. With data in hand, dentists can provide better informed consent, and safer and more predictable surgical outcomes.

**Exposure of impacted teeth:** Utilising CBCT scans, we can precisely locate impacted teeth – like canines – which require surgical exposure for optimal orthodontic eruption.

With modern technology, more accurate and less invasive procedures are made possible. This is because CBCT technology enables direct visualisations of nerve and vasculatures, allowing the avoidance of unnecessary trauma to anatomical structures. Since dentists are able to identify precise teeth positions, smaller incisions and reduced bone removal are advocated, affecting in quicker recovery and less chances of bleeding, bruising, swelling and infection. These superiorities do not hold true for traditional surgery, as flap procedures normally require invasive cutting, which cause elevated possibilities of morbid consequences.



This is an example of a patient with an impacted lower right wisdom tooth, causing food to constantly get lodged between the wisdom tooth and molar. As the patient is unable to clean the area, cavities form, affecting in toothaches.



Here is an example of a patient who wished to begin orthodontic treatment. A routine orthopantomogram (OPG) x-ray (2-dimensional panoramic dental x-ray) (Figure 1) was taken and it was found that her upper left canine was impacted and interfered with the teeth movement. As a result, surgical removal was necessary. However simply using an OPG x-ray presented very little data. A CBCT scan (Figure 2) was also taken as it provided three views including the Axial view (from the top/bottom), Sagittal view (from the side) and Coronal view (from the front) (Figure 3). These differing images enable us to determine the tooth's exact position and its relationship with neighbouring teeth and important structures like the sinus. These precise images allow us to perform minimally invasive surgical tooth removal.

Pictures courtesy of Dato' Dr. Han Kim Chuan.



Here is another case where the lower wisdom tooth was impacted and hidden under the jaw's bone. With CBCT, we're able to detect the tooth's exact positions and its relation with nerves (the red line underneath the teeth).



## Zirconium Crowns with Dr. Raymond Su Wei Siong, DDS(UKM), Msc, Dental Implantology (UCLan, England), FICD



Full mouth rehabilitation with zirconia crowns.



Front teeth aesthetically enhanced with zirconia crowns.



Missing teeth replaced with zirconia bridge.



Porcelain fused to metal crowns and zirconia crowns.

Pictures courtesy of Dr. Raymond Su Wei Siong.

There are many forms of crowns available in the market. These are divided into porcelain-fused-to-metal (PFM) crowns and metal-free crowns. PFM crowns have good mechanical properties, satisfactory aesthetic outcomes and an acceptable biological compatibility for periodontal health. Despite its commendable properties, PFM crowns are disadvantageous because of their metal framework and opaque porcelain, which masks the underlying greyish shade. Furthermore, PFM crowns necessitate more tooth shaving or reductions to enable fabrication, disrupting a patient's natural tooth structure and integrity. Lastly, the cost of precious metals have markedly risen, making PFM relatively unattractive from an economic standpoint.

Metal-free material is increasingly used in dental practices. These are made from different ceramic materials like lithium disilicate, zirconia, leucite-reinforced glass and glass-infiltrated alumina. The dental zirconia or zirconium dioxide crowns are made of zirconium. Since the 1960s, zirconia has been applied in many medical sectors especially prosthetic fabrication due to its excellent durability and biocompatibility.

### Types of Zirconia

There are two types of zirconia: solid and high translucent. Both can be fabricated via Computer Aided Designing and Computer Aided Manufacturing (CAD/CAM) technology which offer patients precise fits and unmatched aesthetic appearances.

Solid zirconia is tougher than its high translucence sibling. It is able to withstand chewing and grinding forces, and is suited for root canal treatment, as it has the ability to support weaker teeth. Due to its opaque nature, solid zirconia is more suited to posterior teeth.

High translucent zirconia is a dental prosthetic which exactly resembles natural teeth. Though superior in appear-

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ance, its strength is still higher than PFM crowns and bridges. Because its aesthetic outcomes are unparalleled, high translucent zirconia is more suited to front teeth, or if extensive orthodontic alignment is needed.

### Zirconium Crown Advantages

**Superior appearances:** Because zirconia is both white and translucent, it allows transformations to any shade to match the rest of your teeth while mimicking natural tooth translucency.

**Better smiles:** Zirconia has no metal linings at the gingiva. PFM crowns conversely, have metal layers underneath the porcelain. This metal lining is normally visible at the gum line and very evident during facial animation. Zirconia overcomes this as shapes and sizes aren't only made to match your teeth, but colours are translucent and natural as well.

**Biocompatible and tough:** There are no reported zirconia crown allergies, as of date. It's also at least five times stronger than porcelain or PFM crowns, has a flexural strength of 1200MPa and can tolerate extreme biting forces.

**Better adherence and metal-free:** Zirconia crowns bond well with teeth to hold crowns in place. Unlike PFMs, zirconia crowns require less tooth removal, hence maintaining your teeth's structural integrity. Lastly, because there are patients with metal allergies, zirconia crowns may be their best bet, as the material is metal-free.