

Issue 004 | Jan 2023

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DIARIES

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HONG KONG & MACAU EDITION

2023

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Can Overload Damage Your Implants?

New Insights In An Old Discussion!
Part II: Technical Complications

ITI HONGKONG

*Treatment of Class II
Increased Overjets
by Carriere 3-D Motions*

DIGITAL DENTURE TECHNOLOGY

Clinic Start-up Package

***TAKE A BREAK
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RELAX***

Practicing dentistry at the highest standards today is a challenge. As dentists we have to stay on top of a rapidly changing science, decide among growing technological innovations and new products and serve patients with ever changing needs and expectations. All these, while striving to maintain work-life balance in difficult times for all can be tough and it is no surprise that dentistry is among the most stressful professions.

At the Dental Diaries, we aspire to support dentists of Hong Kong and Macau on every step. Every quarter, our editorial team will gather the most up-to-date news in the dental field, short scientific articles and case studies, together with lifestyle information, suggestions and ideas to balance a busy working life with some fulfilling personal time. We also want to foster a network, by sharing messages, news and classified ads for the local dental community.

We hope that every time you receive the latest Dental Diaries, you will not only gain professional knowledge, but it would also make your break a little bit more relaxing!

“
**What is
Dental Diaries?**
”



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Can Overload Damage Your Implants?

New Insights In An Old Discussion!

Part II: Technical Complications

In the last issue of the Dental Diaries we introduced the concept of “Overload” and discussed how it has been related to complications and failures since the early days of implant dentistry. We focused in discussing problems with bone and peri-implant tissue, but we also concluded that problems due to loading are manifested more frequently on the mechanical implant components. In particular, what we see as “overloading” failures are often connected with some design flaws or deficiencies. Today Drs. Mattheos and Janda will focus the discussion managing technical problems which can occur as results of adverse loading. More importantly, we will discuss the important underlying design principles which will help us prevent problems and reduce complications with the components, frameworks and veneering of implant prostheses.



Dr. Nikos Mattheos



Dr. Martin Janda

Excessive / adverse loading and technical complications

The implant-abutment-prosthesis complex is a complicated and precise mechanical structure, which consists of many different parts and material held together in different ways. Components that are held together by screws can be in technical terms be described as “bolted joints”, while other interfaces include components held by mechanical friction (e.g. luting cement between abutment and cement retained prosthesis) or chemical-mechanical interface (e.g. metal framework and ceramic veneering of a prosthesis). Excessive / adverse loading can impact each component or their intersections in many ways, leading to the manifestation of different technical complications. As technical and biological complications are interrelated ⁽²⁷⁾, a clinical failure can lead to or be first clinically manifested with a biological problem (Figure 7), further complicating diagnosis and management.



Fig 7(a-c). Fracture of the implant neck with an internal conical connection, first manifested as a periodontal inflammation and fistel (a). Exploratory surgery reveals the crack and consequent inflammatory damage to the surrounding bone (b). The SEM analysis of the explanted implant reveals a fracture as a result of misfit rather than due to fatigue (c).

Complications manifested in the screws.

The effectiveness of a bolted joint, where two components are held together by a screw depends on many factors such as the material, the geometry of the threads, their size, the friction, the shape of the screw head and more. The resulting clamping force which keeps the components tightly connected, derives from complex calculations which also require a specific “optimal” torque to be used for tightening the retaining screw. When a screw is tightened, a clamping force is created due to elastic elongation of the screw. This tensile force applied in the axial direction of the screw is called “preload” and distributed in a nonlinear manner as a result of screw elongation. In general, the optimal recommended preload is around 60% of the screw's plastic deformation



Figure 8(ab). Tall metallic pillar, retained in its base by screws. Note the heavy reinforcement with metallic flanges at the base to counter the lateral forces from all directions.

limit. This allows for a wide safety margin, where that the screw can withstand extra loading conditions without breaking.

Although the screw can consistently withstand axial forces, it's capacity is drastically reduced when it comes to lateral forces causing bending of the screw. To counter this, tall metal pillars held by screws will not only have many screws in their base, but also reinforce it with supporting flanges, in order to counter lateral forces (Figure 8). The bending due to lateral forces increases the risk of both unscrewing and fatigue fractures. Other factors can reduce the load bearing capacity of the screws and increase the risk of plastic deformation and fracture. A common such factor is the reduction of friction by a lubricant such as plaque or saliva (Figure 9). Presence of plaque and saliva in the screw channel ⁽²⁸⁾ will lower friction and increase the clamping force produced under the same torque; leading to an unintentional “overtightening”. This could bring the screw closer to the plastic deformation threshold, which might lead to a fracture under the functional load. When a reconstruction loosens, plaque can very quickly migrate into the screw channel with a lubricating effect. If the screw were to be tightened without prior cleaning, the friction will be drastically reduced resulting in increased preload risking future unscrewing or fracture.

Another critical factor is misfit between the different components of the screw joint. This could result in a skewed or adverse force applied on the screw and

consistently uneven elastic elongation, drastically reducing capacity of the screw to serve under functional load. Screw loosening is one of the most frequently encountered problems in general encountered in Sweden by about 10 of the patients within 5 years ⁽²⁹⁾

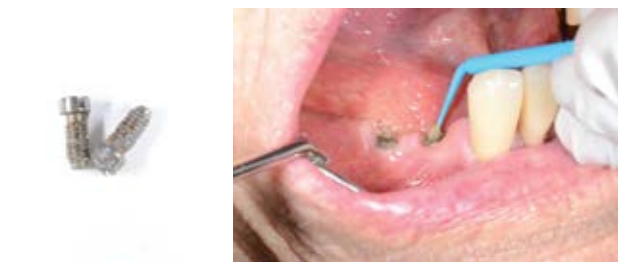


Figure 9 (ab). Screws one week after prosthesis was felt "loose". Notice the migration of plaque along the length of the screws (a) and consequent need of careful cleaning with hydrogen peroxide prior to replacement of the prosthesis.



Figure 10(ab). Proper support of the ceramic veneering by the metal framework can increase the tolerance of the system to functional forces (a) and prevent veneering fractures. A deficient support (b) will predispose to complications even within the anticipated spectrum of occlusal forces.

Complications manifested in the veneer

Veneering complications, either as fractures, cracks or "chipping" are common in implant supported FDPs. Although there is a significant diversity of the prevalence depending on the material and extent of the prosthesis, in general in Sweden, approximately 14% of patients experience such problems within 5 years ⁽²⁹⁾. Although such complications at first appear due to functional forces and loading, the truth is that very often some compromise in the design predisposes to such complications by lowering the tolerance of the prosthesis to damaging forces. For example, veneering porcelain which is not properly supported by the metal framework, will crack easier under "normal" functional (Figure 10).

Another often neglected "predisposing" risk is Misfit of components, which has been shown to also lead to cracks and chipping of the veneering. Ceramic materials are hard and brittle and are easily weakened by cracks. Veneering porcelain has much lower elastic modulus than metals and although can bear heavy load, they are very sensitive to any "bending" forces. Discrepancies and gap of up to 500µm could evade clinical assessment, as the prosthesis could still be placed with torque tightening of the screws ⁽³⁰⁾. If a multi-unit bridge is tightened in the presence of even minor misfit, it will be subjected to certain amount of "bending", leading to tension being formed. Such tension is tolerated very differently from the metal framework than the lower elasticity ceramics. Although not leading to immediate problems, studies have shown that even minor misfit of 150 µm can significantly increase the frequency of veneer chipping under functional load Figure ⁽³¹⁾.

Complications manifested in the abutment and the implant

Fractures of the titanium abutment or the implants are rare and encountered in general below 0.5% of cases ⁽²⁹⁾. A common underlying reason is misfit which can result in high stress concentrated on a small part of the abutment or implant neck (Figure 10), resulting in acute plastic deformation or fracture.

Summing up complications and overloading

The damaging effects of excessive or adverse loading can be manifested on the peri-implant bone and tissue or on the mechanical implant components. It is difficult to clinically quantify the magnitude and direction of naturally occurring occlusal forces, which makes an exact definition of excessive forces or "overload" also elusive at present. At the same time, the alveolar bone has significant ability to adapt to functional load, while its tolerance varies among individuals, location, and other anatomic and physiological parameters. Total loss of osseointegration due to excessive or adverse loading appears possible with an already osseointegrated dental implant, but this has been very rarely documented. Bone density/quality of bone is a large influencing factor.

The components of the implant-abutment-prosthesis complex are designed to function under heavy load and are tested in-vitro to withstand challenging functional conditions. Nevertheless, in clinical reality we can encounter complications due to excessive or adverse load, often manifested in the abutment and prosthesis screws, the veneering and less frequently the implant and the abutment bodies. However, certain design factors can drastically reduce the capacity of the implants to withstand functional loading and predispose to complications, by amplifying the effects of forces. Such factors are typically related to improper design subjecting the implants to adverse lateral forces (Figure 11) and/or misfit (Figure 10, 13) between the different components.

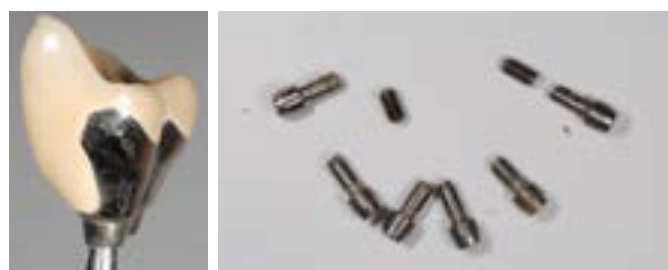
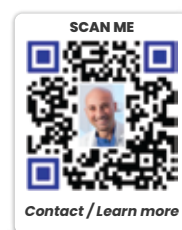


Figure 11(ab). Flat occlusal table, when combined with a steep cusp (a) can guide occlusal forces in a lateral direction, subjecting the prosthesis to "bending" forces. Such forces can be particularly damaging to the abutment or prosthesis screws, which are the weakest link of the "bolted joint". Clinically, this is manifested with repeated screw loosening or fracture (b).

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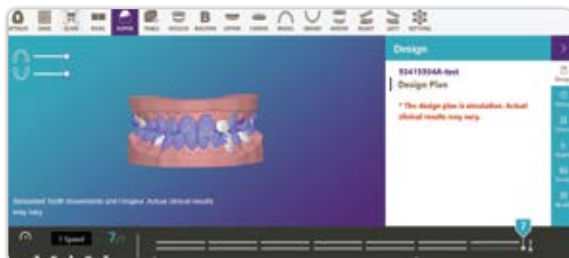


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New Design Software - Trio iDesign

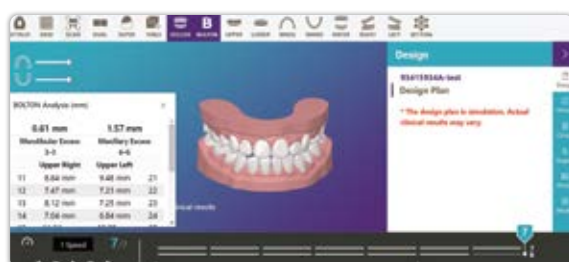
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ITI Hong Kong

It has been a very active period in the ITI Hong Kong, with the old and new study clubs raising steam! At last after several months of restrictions, we saw again friends getting together to reach the latest scientific news but also to enjoy collegial evenings, friendship and a fine dining!

Early in the year, "Synergy HK" hosted Dr. Lorenzana from US, who discussed soft tissue enhancement techniques, while in June the podium was for Professor Ali Murat Kokat who presented an update on hardware complications. "You'll never drill alone" got together its members twice already; in July discussing the Digital Era and in September discussing maxillary sinus and implant dentistry. Likewise, "Nothing to prove" has two very active physical gatherings, where the participants exchanged experiences working with different implant systems, discussed the importance of choice and importantly, its consequences.

But this is not all, as we are moving fast towards wrapping up the year, some events are planned to lead us to the grand finale of 2022. Two more study clubs are planned: the inaugural meeting of the "Anchor" study club, where Professor Ivanovski from Australia will present the future of bone regeneration and the end of year meeting of "You'll never drill alone" where the keys to longevity of the implant prosthesis will be discussed!

Finally, **don't miss the grand finale of 2022 in the ITI session of the HKIDEAS on 3rd December 2022. We have secured for you two great speakers, Professor France Lambert from Belgium, and Dr. Philip Tan from Australia!** Professor Lambert is a well-known researcher and clinician and the head of Periodontology in the University of Liege. Her work extends to many areas from bone regeneration to peri-implant soft tissue management. In the podium she will share her experience and research with the digital workflow for immediacy from the periodontist's point of view.

Dr. Tan is a prosthodontist and entrepreneur from Australia, particularly known for his innovations in mastering fully edentulous patients through a completely digital workflow.

In the morning session he will present his workflow with full arch rehabilitation, and he will discuss how the different aspects of a fully digital workflow can make our work faster, more efficient and safer.

As we are approaching the end of a very difficult year, we can look back to times of stress, restrictions and difficulties that affected us all. However, we can also look back to some amazing energy and enthusiasm, hard work and achievements that have brought us closer together. Next year will be the year to reach even more and the time to celebrate it all together, in the first ITI Campus HK Day! Stay tuned for more soon!



Dr. Philip Tan

Full arch Tooth Replacement – The Digital Way Forward

Webinar

DATE
3rd DEC 2022TIME
9:00AM - 10:30AM

HALL 3F, 3/F, HKCEC



FEE: 1,900HKD*

While complete edentulism rates have dropped, the sheer increase in population growth has meant that more people than ever need assistance with this crippling problem. Thankfully there has been a commensurate growth in technology and materials which provided a wide range of treatment options. This presentation will provide understanding of the options that are available for the wide array of patients that we treat.

Learning Objectives:

- Recognise patient factors that will complicate treatment
- Understand the variety of treatment options available to rehabilitate the edentulous jaw
- Be able to discuss the appropriate application of different treatment options to specific patient situations

Prof Tan works as a specialist prosthodontist in Melbourne, Australia. His background includes a Dental degree from the University of Melbourne (AUS) and Specialist qualifications from the University of Iowa (USA). He is a Fellow of the ITI, member of the RACDS and Fellow of the PFA. He takes a keen interest in all things digital and its application to patient care. As a result, Prof Tan has developed some unique methods for helping patients transition to a full arch implant restoration.



Prof. France Lambert

New insights for immediate loading procedures using digital workflows

Webinar

DATE
3rd DEC 2022TIME
11:00AM - 12:30PM

HALL 3F, 3/F, HKCEC



FEE: 1,900HKD*

The development in digital technologies is currently offering many benefits in restorative dentistry. However, these recent advances can also profit to implant hard and soft tissues integration or for immediate loading procedures.

For instance, CBCT, planning software and CAD-CAM manufacturing processes are nowadays providing breakthrough possibilities to optimize treatment approaches in biological-friendly way. The fabrication of custom-made final abutment and provisional crown prior to guided surgery is of great interest for one-abutment one-time procedures and to promote the peri-implant soft tissue integration. Moreover, the combination of digital impression, new restorative materials and chair-side milling system offer innovative implant protocols allowing the implant biological integration.

Learning Objectives:

The overall objective of this lecture is to emphasize through recent cases series the current possibilities, the potential benefits, and perspectives of emerging digital technologies in implant dentistry.

Prof Lambert graduated with a DDS degree in dentistry in 2002 and completed a post-graduate program in Periodontology at the University of Liège. In 2005, she received a 1-year scholarship to expand her education in implantology at Harvard School of Dental Medicine. Currently she is Professor and Head of the Department of Periodontology, Oral Surgery and Implant Surgery at University of Liège in Belgium and the co-director of the dental Biomaterials Research Unit (d-BRU). Her clinical activity is dedicated to periodontology and implantology. Prof Lambert is also the Past President of the Belgian Society of Periodontology and Delegate at the European Federation of Periodontology.



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*Free access to both webinar after registration, please visit www.hkideas.org for more details.

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COMPLEX IMPLANT SITE & FRESH EXTRACTION SOCKET– Challenge or Essence? For A High Torque Bi-directional Bone Cutting BLX Implant



Dr. Tak-Kun CHOW

- BDS(HK),FRACDS,FDSRCS(Eng),FHKAM(Dental Surgery),FCDSHK(OMS)
- Specialist in Oral & Maxillofacial Surgery, Private practice
- Part-time Consultant (Surgery), Department of Surgery, The University of Hong Kong & Consultant (Surgery) Div. of Plastic & Reconstructive Surgery, The University of Hong Kong (Shenzhen) Teaching Hospital

The purpose of this report is to present a 30 months experience in using a high torque bi-directional bone cutting implant in a private oral & maxillofacial surgery practice since March 2020. Promising clinical outcome in complex sites including fresh extraction socket for immediate implant placement by this newly evolved implant was evidenced by follow up x-ray and Cone Beam CT monitoring. In this cohort of patients, thorough analyze the pattern of the complex sites & immediate implant to fresh extraction sockets to elucidate the sophistication of the implant design & its biomechanical innovations.

The outcome of conventional staged protocol for dental implant osseointegration has been shown to be highly predictable and successful regardless many different designs and brands of implants¹⁻³. Inevitably, earliest implant rehabilitation could relieve both psychosocial and oral dental functional impact to patient after tooth lost, and that should be the parameter of care in contemporary implant dentistry.

Immediate implant placement in fresh extraction socket is a technique that has been developed, especially within the last decade, although it could be dated back to late 1970s at the University of Tübingen, an implant model was specially designed for such procedure⁴. In recent years, there has been an increase in the number of studies on immediate placement which present their results a high success rate of osseointegration as comparable to conventional staged approach⁵. To secure a predictable outcome, the clinician should well master the bio-physiology of fresh extraction socket healing in addition to the initial stability of implant placement. Primary or initial Implant stability is of paramount important for implant placement in fresh extraction sockets and immediately loaded⁶. Variable-thread implant with its feature of high insertion torque⁷ enhancing immediate implant placement was introduced. Surface technologies^{8,9} to enhance immediate placement such as the TiUnite rough-surfaced, nanostructures found on Ti-Zr hydrophilic SLActive® surfaces had been well described to promote osseointegration. Until 2019, a new generation BLX self-drilling implants¹⁰ has been introduced by Fromovich O et al that could have dynamic bone management and a combination of Roxolid alloy® and SLActive® surface specially for immediate placement and loading

purpose so as application in complex recipient sites. **Complex sites** commonly encounter in our daily practice that is either a severely resorbed extraction socket or disease involved socket that could be devastating if not properly grafted or prepared. Kim et al has devised a new classification¹¹ on 5 types of compromised extraction sockets according to destruction of hard and soft tissue. Similar kind of classification by Chang & Cheng¹² could help the implant dentist to follow a treatment algorithm. Furthermore, other complex situation such as localized ridge deformities or patient with systemic disease such as chemotherapy or radiotherapy would also complicate the treatment outcome.

The purpose of this report is to present a 30 months' consecutive series in using a high torque bi-directional thread implant in a private oral & maxillofacial surgery practice since March 2020. Promising outcome in complex extraction sites including fresh extraction socket for immediate implant placement by this newly evolved implant was evidenced by follow up x-ray and Cone Beam CT monitoring. In this case series, thorough analyze the pattern of the complex extraction sites to illustrate the sophistication of implant design to achieve such a promising result.

Materials & Methods: 45 implants were placed in 21 patients for comprehensive prosthodontics rehabilitation in a private oral maxillofacial surgery specialist practice according to a standard protocol since March 2020 till September 2022. 19 implants were placed immediately after extraction whilst 8 of them were immediate functionally loaded with provisional restoration. (Table 1) Nevertheless 19 implants were installed to namely 'Complex sites' need localized bone grafting due to either anatomical, severe bone lost due to dental pathosis or patient with systemic disease background. (Table 2) Clinical and radiographic assessment was performed regularly after implant placement at 6 months, 12 months, and 24 months interval.

Table 1. Immediate Extraction & Implant placement into Fresh Extraction Socket

Region	Tooth Position	Implant size (mm)
Incisor Region – 6 BLX	21/12/22/31/42/11	3.75x12/3.75x14/3.75x14/ 3.75x12/3.75x12/4x14
Premolar Region – 8 BLX	35/44/45/45/25/35/45/35	4.5x12/4.0x12/4.0x12/5.0x8/ 4.0x12/4.5x8/4.5x8/4.5x12
Molar Region – 5 BLX	46/46/37/46/46	5.5x12/5.0x12/4.5x12/4.5x12/4.5x12

Result: 21 patients were treated by 45 Straumann® BLX implant and were restored with either single crowns or multi-unit bridges. Male to Female ratio = 12:9 with the mean age was 55.4 years ± 11.6 (range 23–73). Post-surgery

implant mean follow-up time was 10.74 months $\pm$ 8.09 (range 1-28) from the censored period end by September 2022 by observing clinically immobile implant, negative radiographic peri-implant bone lost, no persistent pain or infection and stable gingival complex. Amongst them 19 implants (42%) were placed immediate after extraction whilst 8 of them were functioned immediately with provisional restoration. 19 implant fixtures (42%) were installed in 'Complex sites'. The distribution of immediate implant placement in fresh extraction socket found predominantly in premolars 42.1% (8 implants), followed by incisors 31.5% (6 implants) and molars 26.3% (5 implants). Thus 84.2% (16 implants) of immediate implant of length longer than 12mm to secure primary stability with insertion torque $>$ 35Ncm. Peri-implant gap to extraction socket wall $>$ 1.5mm were grafted by purified cancellous bovine bone mineral granules with porcine collagen (Creos™) then further secured by a peri-gingival suturing. In Table 2 it showed the pattern of the "Complex Sites" in which 6 sites already with Creos™ socket grafting or ridge augmentation for at least 3 months before stage I implant surgery still need adjunct procedure such as localized bone grafting or internal sinus lift, 3 fixtures were installed at former benign bone tumor excision area and

bone grafted cleft alveolus for dental rehabilitation purpose. Furthermore, two patients with cancer history had chemotherapy or radiation therapy, totally receiving 6 dental implants treatment. Unfortunately, one failing implant was happened in the patient with chemotherapy and chronic smoker background at a grafted premolar socket. The overall survival rate was found encouraging as 97.8% (44/45). All the immediate implant into fresh extraction socket cases with or without immediate functional loading was found 100% successfully. Until mid-September 2022, a molar immediate implant crown found prosthetic failure due to abutment fracture after 18 months functional loading therefore the overall success rate reached as 95.6% (43/45).

Table 2. Complex Sites Profile Analysis: 19 sites in 13 patients

Patient	Complexity	No	Implant size	Implant placement	Adjunct grafting	Outcome
1	Medical- Cancer chemotherapy history	2	(#15) #3.75x6mm, (#14) 4x5mm	Post socket grafting implant placement	Yes	(#15) #infected Failure, (#14) success
2	Medical- NPC Cancer history with RT	4	(#11) 4x14mm+ (#25) 4x12mm<immediate ex & implant> (#46) 4.5x10mm+ (#35) 4x10mm<Standard 2-stage implant placement>	Immed ex & place (#11,25) Standard 2-stage (#46,35)	No	Success
3	Medical- Benign tumor excision site	2	(#14) 4.5x12mm (#15) 5.5x8mm	Standard 2-stage implant placement	No	Success
4	Medical- Cleft alveolus site	1	(#21) 4x12mm	Standard 2-stage implant placement	Yes	Success
5-8	Advanced periodontal bone lost just above mental foramen or maxilla sinus	4	(#45) 5x8mm (#35) 4.5x8, (#45) 4.5x8 (#17) 5.5x8mm< need Internal Sinus lift ISL of a delay ex socket>	Immed ex & placement	Yes	Success
9-12	Severely resorbed extraction socket grafting >3m (periapical infection)	4	(#17) 5x6mm (#15) 4.5x6mm (#16) 5.5x6mm (#25) 5x6mm	Standard 2-stage implant placement	No	Success
13	Atrophic alveolus after unsuccessful sinus grafting	2	(#15) 5x8mm+ (#16) 4.5x8mm <need Internal Sinus lift ISL>	Standard 2-stage implant placement	Yes + ISL	Success

DISCUSSION

Traditional guidelines suggested 2 to 3 months of socket remodeling following tooth extraction and further 3 to 6 months of load-free healing after implant insertion were needed for optimal osseointegration¹³. Such a long rehabilitation time jeopardize the patient's quality of life especially in the aesthetic demand region. The social and economic impact of reduction in number of surgical procedures and in treatment time is unequivocal.

Not until recently, more long-term scientific evidences⁵ were presented to acknowledge the immediate post-extraction implant placement which is a predictable implant alternative with a survival rate similar to that of the conventional technique for implant placement. And yet it still categorized as a high risk of implant failure in comparison to delayed implants¹⁴.

CHALLENGES OF COMPLEX SITES & FRESH EXTRACTION SOCKET FOR IMPLANTATION

In this series **Complex sites** was categorized as severely resorbed post-extraction socket or pre-extraction socket with local infection due to dental pathosis and other ridge deformities including cleft alveolus, post-tumor resection site or failure localized grafted sites so as patient with cancer history after chemotherapy or radiation therapy that might complicate the implant surgery outcome. There-

fore, thorough understanding the biophysiological changes for dental extraction socket and socket preparation would be the cornerstone of success. **Fresh extraction socket** as implant recipient site poses a great challenge for the primary stability of implant placement in addition to its continuous physiological remodeling. Following tooth extraction, the biological cascade commenced by alveolar bone resorption both vertically as well as horizontally resulting gingival collapse then followed by complete bone filling of the socket with sign of radio-opacity similar to the adjacent bone at 105 days¹⁵. Schropp et al.¹⁶ estimated two thirds of the hard and soft tissue changes happen in the first 3 months. In a long-term study¹⁷, the alveolar bone shrinkage could be of 40%-60% in height and width within the first 2 to 3 years. Immediate implant to fresh extraction sites definitely offers alveolar bone maintenance though the concept of alveolar bone preservation is debatable¹⁸. A more recent animal histomorphology study¹⁹ demonstrated implant immediately placed after tooth extraction fail to preserve the alveolar crest of the socket irrespective of their design and configuration. Even though, bone resorption of the buccal crest is more pronounced when placing large size implant (5 mm root-formed implants) when compared to cylindrical implants with a smaller diameter (3.3 mm). In the same study,

the residual defect surrounding the smaller size implant found larger when comparing to the larger size implant group once osseointegration achieved. The necessity of implant-socket gap management fully illustrated by the evidence of 50% reduction in the original horizontal bone thickness following facial/buccal bone remodeling²⁰. Contrary, those with adjunct bone augmentation exhibited a significantly reduced in horizontal resorption of buccal bone²¹. Furthermore, Botticelli et al²² found that 1-1.25 mm wide peri-implant gap defect healed uneventfully with or without membrane. Therefore, we decided to standardize the adjunct treatment for implant-socket gap >1.5 mm for grafting of the gap to attain better long-term outcome.

Insertion torque is most crucial for implant success and survivability especially for immediate loaded single implant. Different implant design could reach its range of insertion torque. Akca et al²³ showed the insertion torque values by placing Straumann® and Astra Tech™ implant as high as 57.6Ncm and 68.5 Ncm respectively at anterior mandible (type I dense cortical bone) whilst the values would drop to an average of 10.7 Ncm and 6.4 Ncm in posterior maxilla (type IV soft bone). In-vitro experiment²⁴ showed BLX implant could be appropriate apply in implant recipient site that lack of cortical bone such as posterior maxilla and could be preferred in cases with type IV bone exists. Moreover, clinical reports^{8,25} showed immediate implant placement at the fresh extraction socket (where initial stability is generally compromised) insertion torque could achieve above 50Ncm²⁶.

When we plan for immediate implant placement in fresh extraction site, several preoperative parameters need sufficient anticipation such as reasons of tooth lost, peri-apical health status and lastly implant size matching. The reason of tooth lost could be a prognostic

CASE ILLUSTRATION

The following 3 cases will summarize an evidence-based protocol in using Straumann® BLX dental implant in Complex sites & Fresh Extraction sites for immediate implant placement in this cohort.

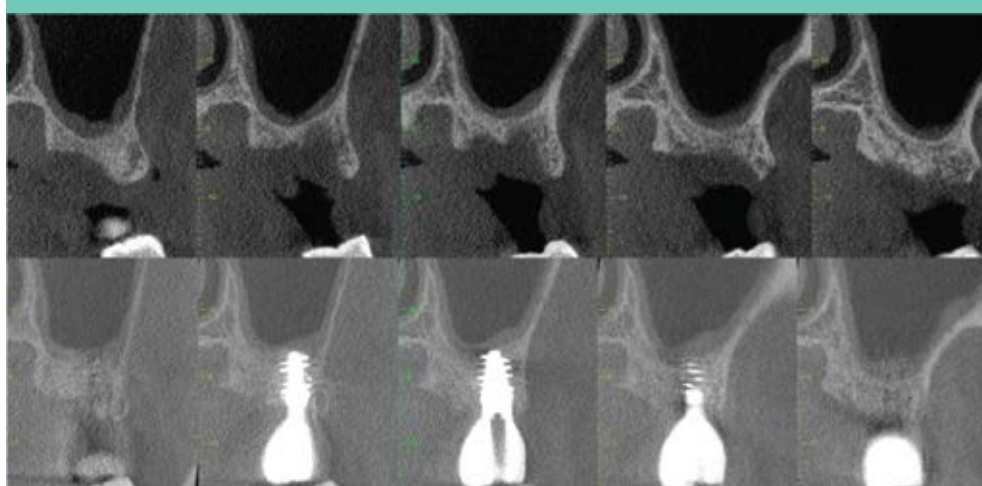
CASE 1A

Male/44 history of #17 root fracture and palatal abscess then extraction by general dentist 1 month before implant. PMHx: obesity, well controlled Diabetics, Socket grafting and simultaneous installation of BLX WB 5.5x8mm with Internal Sinus Lift, crown fitting 4 months after stage I surgery



CASE 1B

Pre-implant socket v.s. post-Crown fitting 1-month CBCT comparison



CASE 2A

Male/56 with history of Nasopharyngeal Carcinoma received radiotherapy 8 years before, fracture #11 crown, immediate extraction, and installation of BLX RB 4x13 mm torque <35 Ncm placement



CASE 2B

MTX angulated crown tightening 3 months after stage I surgery



factor²⁶ of the implant treatment which truly reflects patient's oral functional status. All our patients submitted for immediate implant placement were gone through CT digital planning, implant-socket dimension matching in coronal and apical bony engagement could be well anticipated especially the lower molar socket with inferior alveolar nerve below. Yet 4.5mm or above platform width and at least 12mm implant length was found to be the most used fixture in our series for premolar and molar immediate post-extraction fixture installation that account for 84.6% (11/13) cases. (Table 1) Peri-apical infection is not a contraindication for immediate implant^{27,28}. Though occurrence of peri-apical lesion on implants and implant lost showed clear linkage to history of endodontic or peri-apical pathology^{29,30}. Adequate pre-operative antibiotic therapy and meticulous local debridement is essential in addition to an adequate insertion torque.

Amongst 19 immediate implants, 8 were temporary restored and function immediately. The decision for either immediate temporized and function or in staged procedures were balanced by the patient concern, dental segment location, status of extraction socket and primary stability achieved. We adopted a flapless approach for most of our patient except for those implant site with severe buccal bone lost that need bone augmentation and close in vicinity to vital structure such as mental foramen. Flapless approach for implantation is technique demanding and not suitable for gingival contour needs significant labial augmentation. It is always necessary to anticipate labial soft tissue contour stability as the physiological and predictable loss of facial bone might leads to marginal recession of the peri-implant mucosa³¹. With the advent of imaging technology, Cone Beam CT study showed dimensional changes to the peri-implant facial bone in maxillary anterior single immediate implant placement and temporized at both horizontal and vertical areas³².

SPECIAL FEATURES OF BLX IMPLANT FOR IMMEDIACY & COMPLEX SITES IMPLANTATION

Though various studies^{33,34} showed platform switched implants could achieve a much stable marginal bone level and highly satisfactory esthetic result. The reduced neck diameter of BLX implant¹⁰ is a build in platform switch design to enhance peri-implant osseous gingival support that should be an optimal design for immediate placement at aesthetic

CASE 3A *Male/57 presented with Large secondary caries and heavily restored #37 for extraction and immediate BLX RB 4.5x12mm implant placement, insertion torque 50 Ncm, socket grafting*



CASE 3B *#36/37 screw retained crown issued 3 months after stage I surgery with meticulous preoperative CT planning to maximize the implant length*



demand region. The design of BLX Implant is a bi-directional bone cutting implant with variable thread. It could perform controlled compaction and densification of the peri-implant bone that could provide idea primary stability in all types of bone¹⁰. Moreover, posterior maxilla and type IV bone region or complex sites are lack of cortical bone that BLX implant seems to be prudent choice by extrapolation of this in-vitro experiment²⁴. For complex site in upper molar region, short and wide based BLX found to be an excellent self-drilling implant with round apex with engaging thread help to lift the Schneiderian membrane of maxilla sinus after cut through the socket base meticulously. In an animal study³⁵ showed SLActive® surface is associated with an increased anti-inflammatory macrophage response during early healing phase that contributes prompt bone healing especially in medical compromised subjects. Clinical studies^{36,37,38} showed superb implant survival rate for SLActive® surface implant in both diabetic patients and oral cancer patients receiving irradiation therapy.

Finally, the overall cumulative survival rate and success rate of the present series was 97.8% and 95.6% respectively which is comparable to the reported literatures^{5,25,26,39,40}. Moreover our immediate temporized and function implant achieved 100% success. All our patients were advised follow up at 6th months, 1st year, 2nd year after implant installation with periodic radiographic monitoring of bone level and peri-implant mucosal status such as stable papilla and soft tissue recession.

CONCLUSION

This clinical report reviewed 30 months experience in using Straumann® BLX dental implant rehabilitation with good clinical outcome in a Hong Kong private implant practice. As Complex Sites & immediate implant placement in Fresh Extraction Socket demand exceptionally on the dental implant design and high insertion torque to achieve promising primary stability to accelerate osseointegration. The variable bone cutting thread, high insertion torque and SLActive® surface and the versatile implant body width and length options are the salient aforementioned features. Nowadays with the biomechanical innovation of implant design, Complex Sites & Fresh Extraction Socket treatment outcome has now been an essence rather than a challenge to immediate dental implant system.

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Disclaimers

The author does not have any financial interests in organizing this clinical study in related to the products listed.

Patient Consent

All clinical photos were obtained approval to publish in this manuscript.

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In the past few years, the Covid-19 Pandemic has impacted to the social and health sector world-widely. Graciously in the past 30 months all the patient, staff and other logistic personnel diligently accomplished the whole implant treatment journey with a fruitful outcome.

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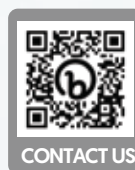
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Staining of Invisalign® vs ClearCorrect® aligners

1. Introduction

Clear aligners from Invisalign using the SmartTrack® material and ClearCorrect using the ClearQuartz™ material were tested in vitro to assess and compare their tendency to stain.

2. Materials and Methods

2.1 - Staining

Different staining media were used to condition the aligners by full immersion at 37°C for 24h. Coffee solution was prepared with soluble coffee (Nescafé Gold) at a concentration of 30 g/L. The mustard (Thomy mild), cola (Coca-Cola), and red wine (Monte Chiara Montepulciano d'Abruzzo) were used as purchased. For each staining medium, one Invisalign aligner and one ClearCorrect aligner were fully immersed in the medium and kept at 37°C for 24h. Samples conditioned in deionized water were used as reference.

2.2 - Color measurement

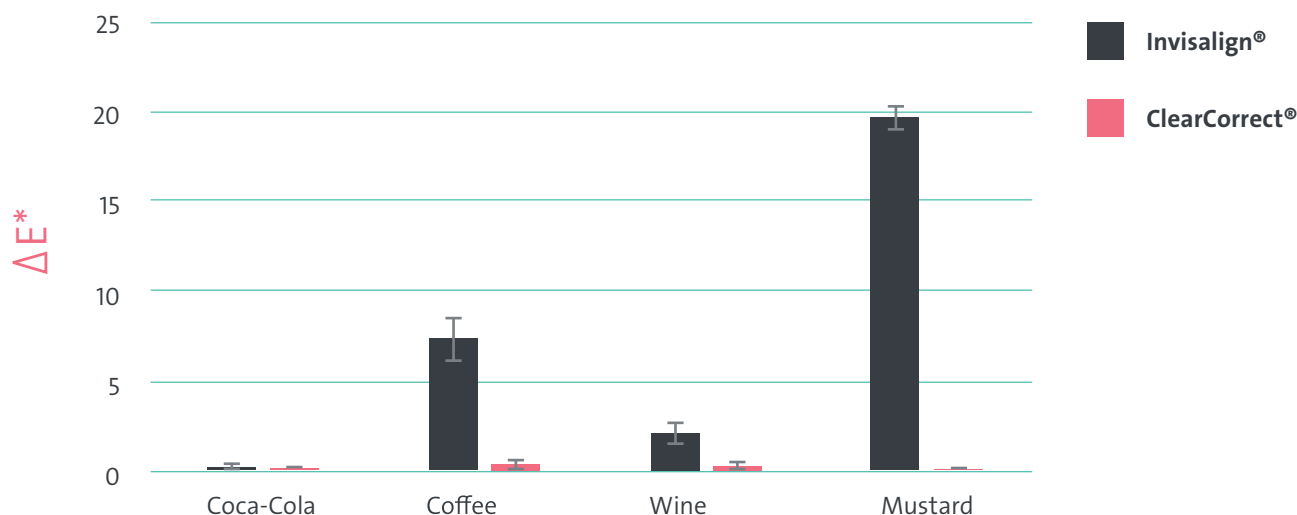
After the staining, sections of aligners were cut on either the incisors or the last molars. These regions allowed collection of relatively flat samples approximately 1 cm x 1 cm, suitable for color measurement in transmission mode. A minimum of 3 specimens were collected from each aligner. The color measurements were run on each specimen using a colorimeter HunterLab UltraScan PRO with standard illuminant D65, 10° observer, and white tile as reference. The total color differences between each stained aligner and the reference aligner (conditioned in DI water) were calculated from CIELAB color space¹. Average and standard deviation were calculated for each aligner and staining medium.

3. Results

The figure below shows the aligners after the staining procedure. Invisalign aligners have visible tendency to stain compared to ClearCorrect. ClearCorrect aligners appear to only be affected, along the trimline region, where the middle layer (elastomeric polyurethane) is exposed. This shows that the outer layers of the ClearCorrect aligners are barely affected, acting as a barrier to the diffusion of staining agents.



The color difference between the aligners after staining and the reference sample is shown in the figure below. The error bars were calculated from the error propagation of the standard deviation.



CIELAB color change (ΔE^*) can be correlated to a rating system, based on visual assessment of color differences, commonly used in the scientific literature^{2,3}, as shown in the table below.

Aligner system	Staining medium	ΔE^*	Color change rating
Invisalign	Coke	0.23 ± 0.21	Trace – Extremely slight change
	Coffee	7.45 ± 1.17	Much – Extremely marked change
	Wine	2.17 ± 0.52	Noticeable – Perceivable change
	Mustard	19.86 ± 0.66	Very much – Change to other color
ClearCorrect	Coke	0.16 ± 0.14	Trace – Extremely slight change
	Coffee	0.42 ± 0.21	Trace – Extremely slight change
	Wine	0.34 ± 0.19	Trace – Extremely slight change
	Mustard	0.14 ± 0.08	Trace – Extremely slight change

4. Conclusions

According to the tests performed, Invisalign aligners were susceptible to visible staining when fully immersed in wine, coffee and more prominently with the mustard sample. ClearCorrect aligners showed only slight staining at the trim line with each of the staining media. This result may support the hypotheses that the polyurethane elastomer layer (middle layer in ClearCorrect's aligner) is responsible for the absorption of staining compounds, as suggested by previous studies^{2,3}.

1 DIN EN ISO/CIE 11664-4:2019 Colorimetry – Part 4: CIE 1976 L*a*b* colour space.

2 Liu, C.-L. et al. Colour stabilities of three types of orthodontic clear aligners exposed to staining agents. *Int. J. Oral Sci.* 8, 246–253 (2016).

3 Bernard G, Rompré P, Tavares JR, Montpetit A. Colorimetric and spectrophotometric measurements of orthodontic thermoplastic aligners exposed to various staining sources and cleaning methods. *Head Face Med.* 16, 1–11 (2020).

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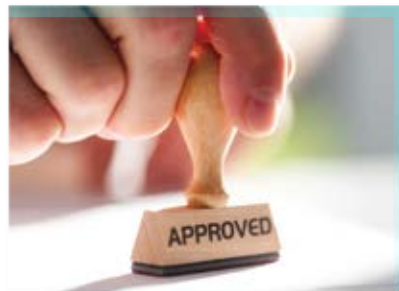
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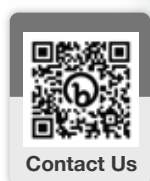
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New Root Canal Irrigation System

Ac-Dent, Inc. has announced the launch of the iVac™ Apical Negative Pressure Irrigation and Activation System. The system was created using some of the most important concepts established by endodontic research for root canal irrigation and disinfection, namely ultrasonic vibration, negative pressure, and contaminant irrigation.

The iVac system is said to improve root canal irrigation and disinfection efficacy by utilizing these 3 irrigation fundamentals into a single device that pairs with most piezo ultrasonic handpieces.

With the iVac, the irrigating fluid cleans and disinfects the entire root canal to its working length while preventing the extrusion of the irritant. In cases where irrigation depth control is crucial, such as paediatric patients, apexification, regeneration, and resorptions in the apical foramen, a system like this may be beneficial. The continuous exchange of ultrasonically activated irritants with constant refreshment throughout the procedure is possible with the system's design.

Exocad Introduces Dental Software

A new generation of DentalCAD CAD software has been released by Exocad, an Align Technology company. This new release includes 45 new features and 85 enhancements that optimize dental workflows for increased productivity.

"DentalCAD 3.1 Rijeka is the result of our countless conversations with customers and the dedicated research of our software developers, I'm excited about the broad scope of new

features and improvements that brings more speed and smoother workflows, from treatment planning to design and manufacturing," said Mr. Steinbrecher, CEO.

The new Smile Design report provides comprehensive documentation of the aesthetic planning process to benefit communication between dentists and laboratories, whereas the new Smile Window offers instant, in-face visualisation, allowing users to see what the result would look like in real time.

Dental Industry News

Smile Source Has Partnered With iCreditWorks

iCreditWorks will partner with Smile Source to exclusively promote transparent financing to its member dentists and their patients. With the introduction of the first-in-market native mobile App, iCreditWorks provides patients access to affordable financing anytime, anywhere. Checking loan options takes only seconds via the iCreditWorks mobile App and the application experience is simple, seamless, and secure from the privacy of a patient's mobile device. Through iCreditWorks, the practice is paid instantly when the patient taps "Pay My Dentist."

"The Smile Source community of dental professionals is forward-thinking and progressive in their commitment to offering patients a world-class dental experience, and iCreditWorks is proud to play a part in this mission," says CEO of iCreditWorks.

This partnership comes at a time when dentists and patients are looking to enhance the overall experience. By using the App to remove friction that both the office staff and the patient experience when contemplating financing, the two Company anticipate an increase in case acceptance and a better experience for patients.

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Simultaneous Implant (Neodent) Placement With Bone Augmentation Using GBR Technique: A Case Report



Dr. Teoh Chang I Chun

Dental implants have well been established as a predictable treatment option for restoring partially edentulous cases (Pjetursson et al 2012). It is recommended to have adequate dimension of bone volume for optimal three-dimensional implant placement (Resnik and Misch 2017). For a stable and predictable outcome, it was suggested 2mm or more of bone width around the implant, especially buccally at the crestal area of the alveolar ridge, for long-term bone stability (Spray et al 2000, Grunder et al 2005). Often, clinicians may face situations whereby the width of the alveolar ridge is less than optimal width, then there is a need to increase the ridge width to 6 to 8mm either prior to or simultaneously with implant placement. Guided bone regeneration (G.B.R.) is one of the most deployed techniques for such purpose (Buser et al 1996). Although a few authors had demonstrated the effectiveness of using biomaterials such as ABBM protected with resorbable collagen membrane (Hammerle et al 2008). However, there is concerns of graft displacement at the ridge crest caused by the pressure of closing the overlying flap (Urban 2017).

This article is a case report on simultaneous implant placement together with Guided Bone Regeneration.

A 60-year-old gentleman with no relevant medical history requested for implant treatment in Q4. He recently lost 47 and presented with Free End Saddle in the lower right mandible. Clinical examination, Panoramic radiograph, and Cone Beam CT scan (Fig 1, 2 & 3) indicated the lower right alveolar ridge of sufficient dimension of was available for implant placement. The final treatment plan was to place two implants in 45 & 46 region with simultaneous bone augmentation using Guided Bone Regeneration. The treatment plan and procedure were carefully explained to the patient and a consent document was signed by the patient to signify the agreement of treatment.

Local anaesthesia (Xylestein A 3M ESPE) was given with buccal and lingual infiltration, and Inferior Dental block was avoided. The surgery started with a mid-crestal incision plus intrasulcular incision around buccal of 44 and ending up with mesial releasing incision at 44, which would allow better access to buccal side of the alveolar ridge. A full thickness mucoperiosteal flap was then elevated on both buccal and lingual side. It is important to identify the surgical landmark such as the mental foramen on the buccal side, where the mental nerve emerged, the mylohyoid muscle on the lingual side. The alveolar ridge was completely exposed. Any remnant of soft tissue on the bone surface should be removed (fig 4). The width of the ridge crest was around 5mm and there was good bone height (> 14mm) above the Inferior Dental Canal. Implant osteotomy site preparation was carried out following the protocol described by the manufacturer (NeoDent). The osteotomy site preparation at 45 received special attention in order to avoid damaging the Mental Nerve (Fig 8, 9). 2 x NeoDent 3.7mmD x 10mmL and 4.3mmD x 10mmL were inserted with good primary stability (60Ncm torque) (Fig 5, 6, 7 & 10). The implant heads were placed so that they were levelled with the crestal bone. Although the implants were cover with bone, minor dehiscence area presented on buccal and lingual sides. Autogenous bone was harvested with bone collector (NeoBiotec ACM) using straight handpiece at slow speed (150 RPM) Fig 11, 12. The bone chips harvested were then mixed with ABBM (Bio-Oss) particles to increase its volume and stability. The bone graft mixture was then placed on buccal and lingual side of the implants and protected with a collagen membrane (OssGuide) which was in turn stabilized with bone tacks (Ustomed). The bone tacks helped to keep the membrane in position and prevent migration of the bone graft materials. Periosteal releasing incision was made on the buccal flap, the objective is to elongate the buccal flap to provide a tension free primary closure. Buccal and lingual everted flap margins were secured with multiple sutures.

Conclusion

High insertion torque values can be achieved when dental implants are placed completely within the native bone. However, when the remaining bony wall is thin on either buccal or lingual side, it is recommended to increase the hard tissue thickness with bone augmentation procedure. GBR is a highly successful and predictable technique. Inclusion of autogenous bone particles will enhance bone formation next to alveolar ridge. It is also important to stabilize the collagen membrane with bone tacks or fixation screw to prevent unwanted movement of the bone graft materials under the pressure of closing the soft tissue flap (Mari et al 2016). This paper highlighted such an approach with implant placement and simultaneous bone augmentation with GBR technique.



Fig 1. Pre-treatment Panoramic radiograph.

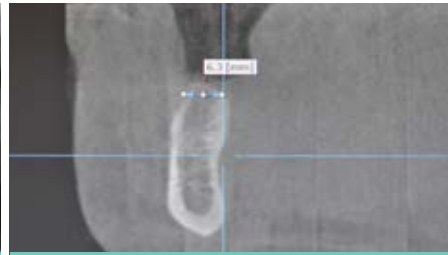


Fig 2. Cross section scan in.

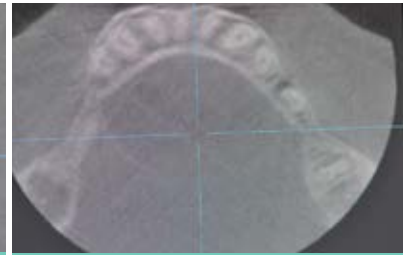


Fig 3. CBCT scan revealed the ridge dimension was narrow in 45 & 46 area.

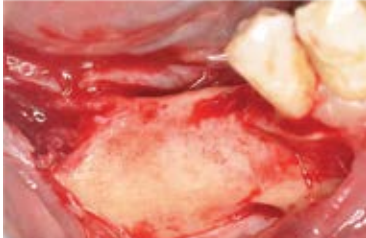


Fig 4. Exposure of the entire alveolar ridge including the mental foramen and mental nerve.



Fig 5. Insertion of NeoDent 4.3mmD x 10mmL implant in 46 site.



Fig 6. Ratchet tool was used to insert the implant to its final position.



Fig 7. Good primary stability (60Ncm torque) was achieved.



Fig 8. Mental foramen was identified, and mesial extension was measured with a periodontal probe.



Fig 9. Implant osteotomy site was well above the Mental foramen.



Fig 10. Two NeoDent implants were inserted with good primary stability.



Fig 11. Donor site in retromolar area.



Fig 12. Autogenous bone chips harvested with Bone collector.



Fig 13. Xenograft (Bio-Oss particles) was mixed with autogenous bone chips.



Fig 14. Collagen membrane was initially placed on the lingual side.



Fig 15. The collagen membrane was stabilised with bone tacks on lingual side.



Fig 16. Graft mixture was placed on buccal and lingual side of the alveolar ridge.



Fig 17. Bone tacks on buccal side to stabilise the collagen membrane.



Fig 18. Buccal periosteal releasing incision was made for flap elongation.



Fig 19. Tension free flap closure was achieved.



Fig 20. Post treatment Panoramic radiograph.

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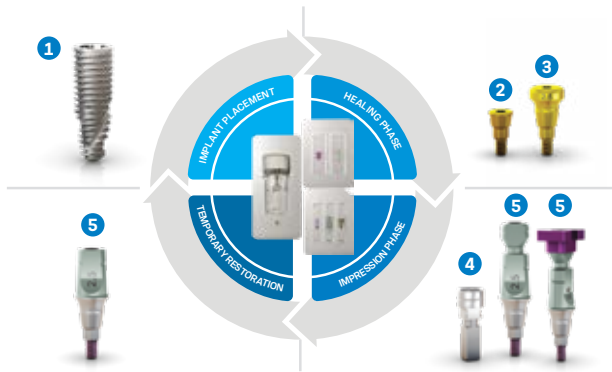


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	<i>Including: Instrument, Handpiece, Restorative, Endo, PPE & Disposables</i>				
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Will 3D Printed Dentures

Be The Next Breakthrough In The Digital Revolution?



Complete edentulism remains a major global problem, with a large segment of the population in need of dental prosthesis in the developing but also the developed world. In UK alone, 6 % of the population is in need of dentures, many of them older, under financial constraints and often struggling with poorly fitting dentures or none at all, according to Dr Andrew Keeling

From the University of Leeds. Hong Kong is not an exception, with an increasing elderly population. Initiatives of the HK SAR government and the dental association have been introduced in the past to support affordable dentures, a large need remains among the many edentulous.

Although by some estimations more than 50 million dentures are produced globally each year, the amount of people in need is far greater, not only with regards to people requiring their first set of dentures, but also people who lose them – a situation that occurs frequently, particularly in hospitals and care homes for the elderly. Currently in the UK, the time and cost of making a new set of dentures means that people can be left without teeth for months, with knock-on effects on nutrition and confidence. According to sources in UK NHS right now, it takes several dental appointments and costs of thousands of pounds to make a new set of replacement dentures in a care home settings.

Traditional denture manufacturing is a complex craft with a steep learning curve, and dental labs increasingly struggle to find technicians with the advanced skills and expertise required to produce them. It is also often reported that young dentists lack the skills to help patients with full dentures, as their exposure to such procedures is minimal during the undergraduate curriculum. Still, only 1 percent of the dentures are currently produced with digital tools.

3D-printed dentures could be a game changer, having the potential to solve a lot of problems. Modern clas- II long-term biocompatible Denture Base Resin and Denture Teeth Resin enable dental professionals to produce 3D printed full dentures accurately and reliably, while they could be cheaper, easier and faster to produce. Although the manufacturing process to create a digital denture is different from the traditional workflow, the chairside process does not require any different skills and might be far simpler for the dentists to conduct. The dentist will need to produce:

- A poured and articulated final impression
- A bite rim with information of the lip line, midline and occlusal plane
- Information about the desired tooth shape, shade and other clinical considerations

A properly trained digital dental technician would then take over the process from producing the digitized patient model to 3D printing the full denture on stereolithography 3D printer.

Would the 3D printed denture fulfil the purpose and ensure proper function, fit and aesthetics for our patients? Pilot results by Dr at the University of Leeds were very promising. His team conducted a pilot study, funded by the Dunhill Medical Trust, in which they collaborated with three dental centres equipped with a digital scanner. They worked to refine the scanning software and optimise the 3D printing process, then trialled the results with patients. Each participant in the study was given two sets of dentures: one made using traditional methods, and one made using 3D printing. Overall, both sets were scored about the same by wearers, confirming that the new versions were at least as acceptable as the conventional ones.

An increasing body of scientific literature is pointing to this direction as well. In 2020 Dr. Anadioti from the University of Pennsylvania reviewed 21 selected studies on 3D printing technology application for complete dentures. They found that milled dentures have been studied more than 3D printed ones in the currently available literature, although the body of evidence for 3D printed dentures is rapidly growing. Nevertheless, they concluded that Initial studies on digital dentures have shown promising short-term clinical performance, positive patient-related results and reasonable cost-effectiveness. 3D printing has potential to modernize and streamline the denture fabrication techniques, materials and workflows. They called for more research on the existing and developing materials and printers to allow for advancement and increase its application in removable prosthodontics.

Limitations of the technique often reported poor esthetics and retention, inability to balance occlusion and low printer resolution. However, as techniques and technology develops rapidly, many of the problems encountered in older studies might be already overcome. Also, 3D printing can be applied to many interim stages such as fabrication of custom tray, record bases, trial, interim or immediate dentures.

So it appears we are at the verge of yet another new breakthrough of the digital dentistry revolution, possibly a less fancy one but this time with the potential to change the lives of millions of people, especially in the underprivileged parts of the population. You can discuss with your dental lab about the potential of the technology or you can use services such as www.dentfish.com to find skilled dental technicians to help you grow into the promising domain of CAD/CAM complete dentures and also to offer your patients a service that they will very much appreciate!

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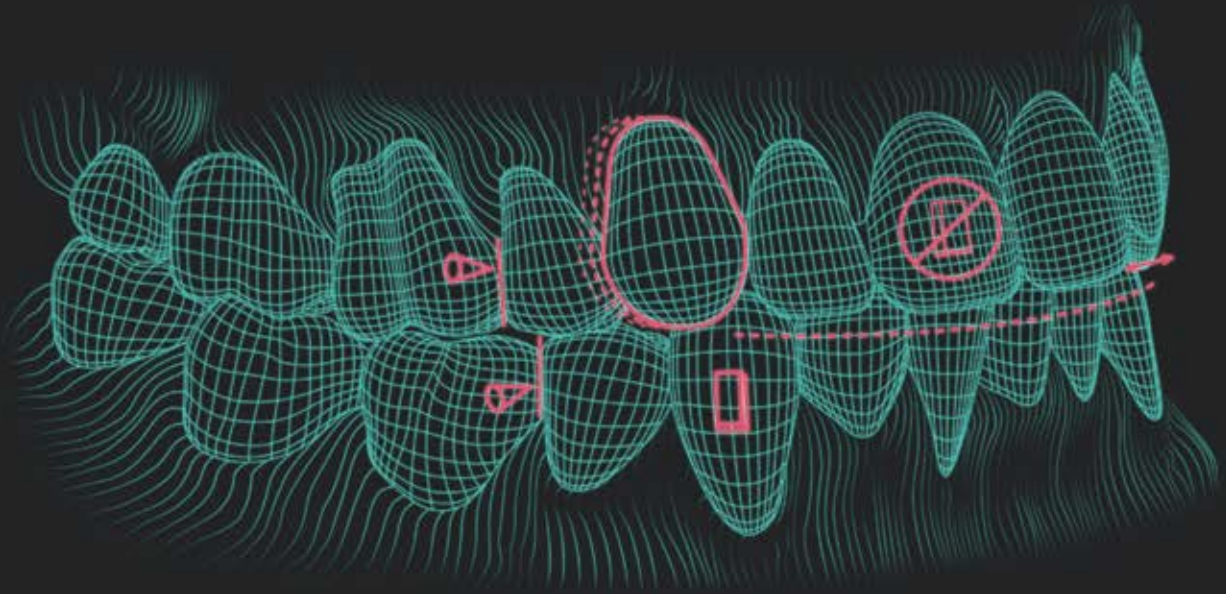
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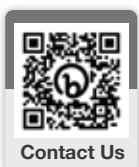


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Since it was first founded in 1685, Boschendal Farm in the Cape winelands has become world-famous for its food, wine, farm produce and generous country hospitality.



Today, after a decade of rejuvenation, reinvention and refinement, this iconic Cape farm has evolved into a landmark winelands' destination offering a diversity of food, wine and outdoor experiences united by a common ethos of sustainability.

WHERE ROOTS RUN DEEP

While Boschendal Farm has evolved into one of the leading hospitality destinations in the winelands of the Western Cape, it takes pride in celebrating its three centuries of history as a humble working farm. Across the property you'll find the agricultural heritage of this storied estate woven into every aspect of the guest experience. The abundant Food Garden – not to mention the free-range chickens, and herds of Angus Beef, all pasture-reared – provides fresh produce for The Werf restaurant, The Deli and the Farm Shop & Butchery, while guests overnighing on the estate enjoy a generous welcome hamper of garden herbs, fresh vegetables and farm produce. Caring for the land, and celebrating the produce it provides, is the thread running through each aspect of the Boschendal Farm experience.

FROM SOIL TO FORK

The chefs at Boschendal are truly inspired, and guided, by the seasons. When crafting his menus, Executive Chef Allistair Lawrence looks first to what the farm has provided, from fresh herbs and vegetables out of the bountiful Food Garden, and the abundant fruit orchards, the livestock that roam free on grassy pastures. This remarkable open-air pantry informs the diversity of culinary offerings on the estate, from contemporary small-plate dining at The Werf restaurant, to the generous bistro-style plates and ever-popular farm breakfasts at The Deli. For visitors looking to take home a taste of Boschendal, the shelves of the Farm Shop & Butchery are piled high with fresh vegetables from the Food Garden, farm salads, handcrafted estate products and artisan breads baked on site each day. In the summer, generous picnic baskets can be enjoyed at tables laid out on the lawns surrounding the historic Rhone Homestead.

GET ACTIVE!

There is certainly no shortage of opportunities to work up an appetite on Boschendal Farm. Stretched across 1800-hectares, the estate ranges across orchards and vineyards, pristine fynbos and rugged mountain slopes. Strung out across this outdoor playground are world-class mountain bike and running trails – carefully laid out to cater for a range of experience levels – alongside scenic mountain walks through indigenous fynbos. Horse-back rides offer a more sedate way to explore the estate, with a choice of trails and mounts ensuring both novice and experienced riders will feel welcome.

Young visitors will love The Treehouse at the Werf, with an outdoor kids' playground and pump track open to all visitors. Both Overnight guests as well as day visitors can take advantage of the creative kids' programmes that allow young travellers to enjoy free-range fun on the farm, while learning about nature and sustainability.



At Boschendal,
we celebrate the past, present and the future.

STAY THE NIGHT

Some would say that the true magic of Boschendal is revealed at night, when a deep quiet settles on the countryside and overnight guests enjoy the rare privilege of soaking up the peacefulness of this historic estate. Boschendal offers an array of overnight accommodation, from elegant country living in the Werf Garden Suites to family-friendly self-catering options in the Orchard Cottages. Families and groups seeking exclusive villa accommodation can choose between the contemporary six-bedroom Mountain Villa and the historic Cottage1685, built by acclaimed Cape architect Sir Herbert Baker. For those travelling with furry four-legged family members, Trout Cottage on the flanks of the Simonsberg is proudly pet-friendly.

A PLACE FOR CELEBRATION

The diversity of venues and experiences on the estate have made Boschendal a sought-after destination for glamorous events, corporate gatherings and private celebrations. The heart of the estate's event offering is the The Olive Press, a purpose-built events venue set alongside the historic Werf precinct. Capable of hosting up to 200 guests this elegant function space gives onto wide private lawns and gardens with a backdrop of dramatic mountain vistas. The talented brigade of chefs, under the leadership of Executive Chef Allistair Lawrence, are adept at creating bespoke menus to fit the style, size and budget of any event.

In addition to The Olive Press, the estate's landmark rose gardens, historic manor houses and oak-lined avenues offer dreamy destinations for intimate events, celebrations and weddings. The Werf restaurant can also be booked on an exclusive-use basis.

ART AT THE MANOR HOUSE

Boschendal farm and Norval Foundation has established a formal partnership that will introduce guests visiting the much-loved historic Winelands farm to some of South Africa, and the continent's, top artists. The partnership will see the establishment of a series of satellite art exhibitions hosted at Boschendal's historic Manor House and surrounding grounds. Visitors will be welcomed by a contemporary collection of art that contrasts with the Manor House's rich history, providing a nuanced experience for art lovers. The first year's programming will be drawn from Norval Foundation's Homestead Collection, which features artists from across Africa, but with a strong Southern Africa representation. Exhibitions will rotate every three to four months and admission is free. This collaboration with Norval cements the farm's commitment to celebrating emerging creative talent through arts and culture.

SUSTAINABILITY

There are no passengers on spaceship earth, only crew. And so Boschendal Farm is passionate about seeking, and creating, a more sustainable way of living. Across the estate, from agriculture to hospitality, the focus is on constantly inspiring and pioneering new ways to live in the world of which we are custodians. Ways that regenerate and reinforce natural resources and rhythms, fostering healthier ecosystems and, crucially, supporting and developing the communities that call this corner of the Cape winelands their home.

Visitors to the farm are also invited to gain a deeper understanding of this sustainable approach on our daily Farm Tour. Here local guides lead guests on a walk through the Food Garden, Werf precinct and surrounding farmland, to explain the history of the farm, and the regenerative farming practices and sustainable gardening on display.

BOSCHENDAL, AT HOME

To help locals tap into the rich array of produce, crafts and gifts available at the Farm Shop, in April 2021 Boschendal launched an innovative online shopping experience. This new online presence allows lovers of fine food and décor to seamlessly access the array of produce and products grown, crafted and created on the estate, and in the surrounding winelands. Whether you're craving homemade jams from farm-fresh fruit, or the flaky pasteis de nata from our bakery, the online portal puts some of the Cape's finest fresh produce a few clicks away. Alongside the delicious produce and farm-to-fork food items, visitors can also shop a beautiful collection of bespoke homeware, crockery and cookbooks. The new homeware store is brimming with local is beautiful textiles, home décor and body products- all the more reason and ways for you to take Boschendal with you and enjoy long after you have left the farm.



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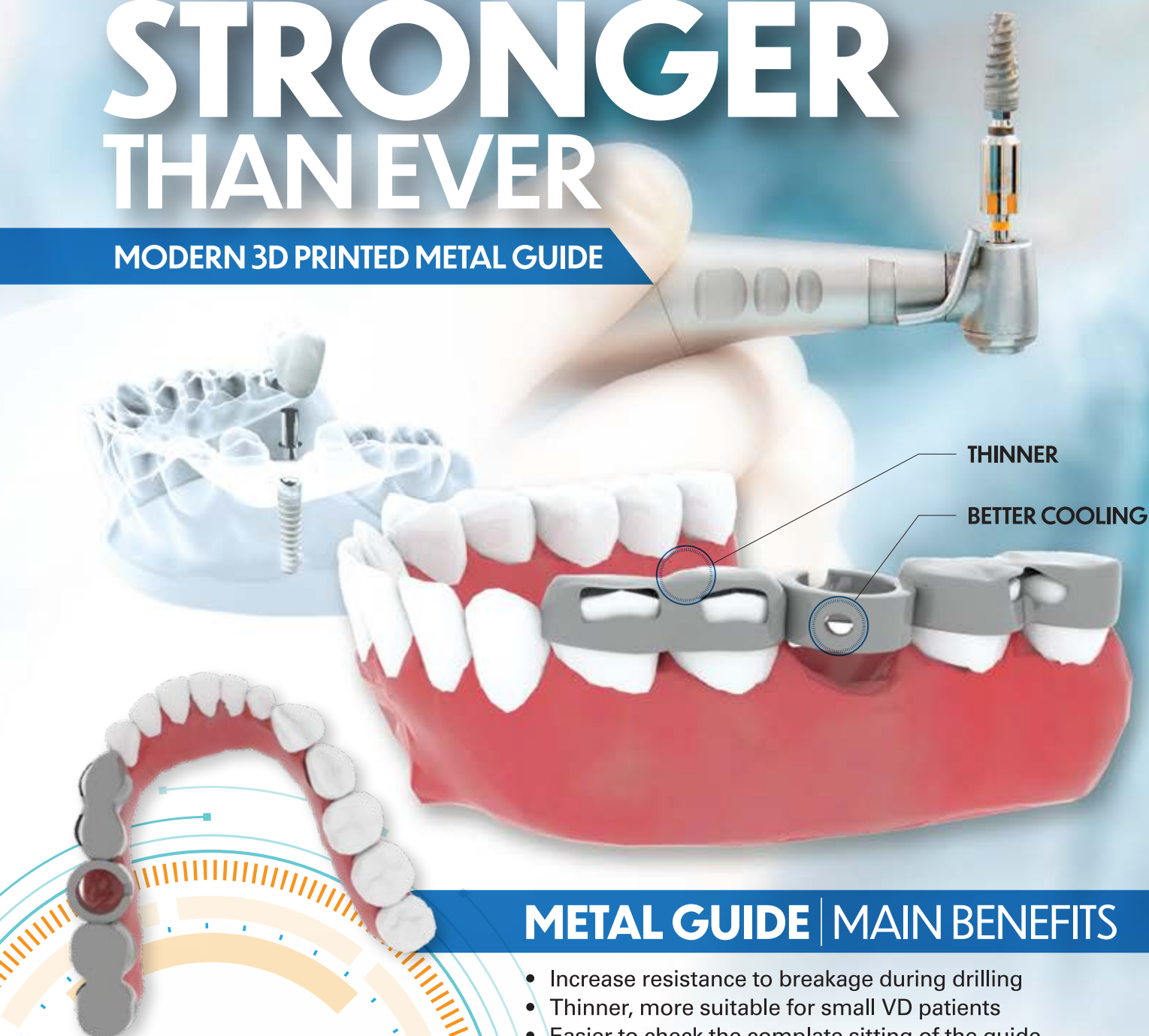
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Treatment of Class II Increased Overjets by Carriere 3-D Motions



Dr. Kevin NG



Dr. Steve HC Law



Functional Appliances, Mandibular Advancement by Invisalign were commonly used for the correction of Class II malocclusion in young children before peak growth spur. This report demonstrates 2 cases of using CMA to correction Class II with satisfactory results. The CMA was developed by Luis Carriere in 2004, named Carriere Distalizer and later renamed it as Carriere Motion 3D Appliance. It has gained popularity over the last decade. It consists of two metal bars attached bilaterally to the upper canines and first molars. Hooks at the canines were designed for placement of inter-maxillary elastics. This is bonded to the anterior third of the clinical crown or the first premolar if the canines were not erupted yet. At the first molar areas, the molded pads with a ball-and-socket joint were cemented at the center of its clinical crowns to facilitate molars distalization and de-rotation.

The principle of CMA is to establish Class I Molars and Canines relationship by activation of the appliance with heavy inter-arches force I, 2 elastics (1/4 " 6 oz and 3/16" 8 oz.) . Class II elastics with anchorage provided by the clear retainer or fix appliance at the opposite arch. Full-time wear of Class II elastics (22 hours daily) is required. It is also recommended to change elastics every 4 hourly. Phase I treatment usually takes 6–8 months to complete. The patient compliance and co-operation must be high, and alignment of both arches must be combined with uses of clear aligners or fixed appliances after 6-8 months. (1)

CASE REPORT 1

Young boy aged 13yr 8m were referred by other dentist to prescribe Mandibular Advancement (MA) protocol by Invisalign. The overbite were 100% deep and lower incisors were traumatizing the upper soft tissue. The over jet was 10mm with lower face retruded and short. Previous patient seen an orthodontist, who had suggested to use Herbst appliance but were declined by patient. From the lateral x-ray we could expect significant amount of adolescent growth since there is concavities developing at the lower border of C2 and C3, the lower border of C4 is flat and C3 and C4 are more rectangular in shapes. Aligners with Mandibular Advancement Function design were worn for 10 months without many improvements and the Carriere Motion 3D appliance were prescribed using full day 6 oz 1/4" Class II elastics bilaterally together with vibration accelerator for 5 min daily. Improvement was obvious after 2.5 months. After another 6 months with slightly over-correction, the appliances were removed and use refinement aligners to finalize the alignments and the outcome was satisfactory. No roots resorptions and other patholoav were observed.

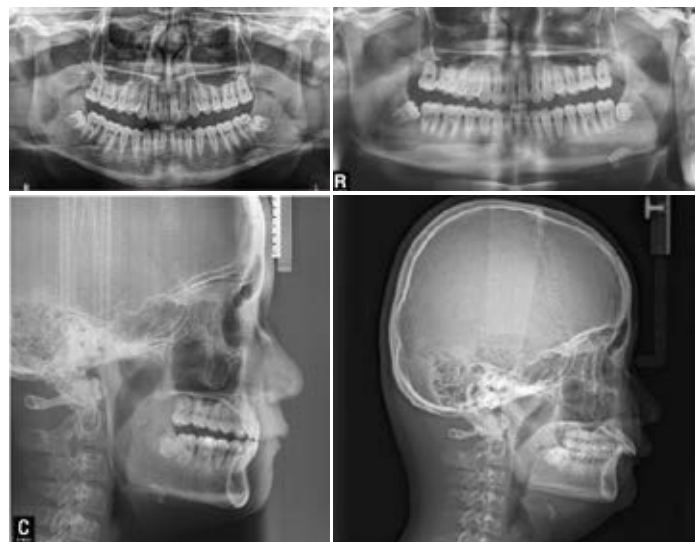
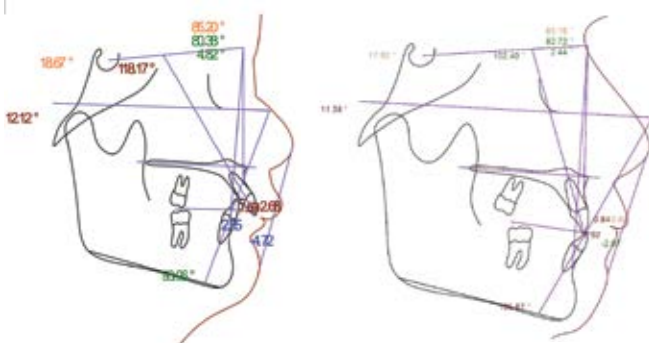


Fig 1. X Rays before treatment

Fig 2. X Rays After 18 months treatment



Name	Unit	Value	Normal	Difference	Wiggle	Name	Unit	Value	Normal	Difference	Wiggle
Skeletal Analysis						Skeletal Analysis					
Angle SNA	[°]	85.2	80.0	5.2		Angle SNA	[°]	80.8	80.0	0.8	
Angle SNB	[°]	82.7	82.0	0.7		Angle SNB	[°]	76.5	82.0	-5.5	
ANB	[°]	2.4	2.0	0.4		ANB	[°]	4.3	2.0	2.3	
SN-MP-abo	[°]	17.9	32.0	-14.1		SN-MP-abo	[°]	33.4	32.0	1.4	
FMA-abo	[°]	11.4	25.0	-13.6		FMA-abo	[°]	20.9	25.0	-4.1	
Dental Analysis						Dental Analysis					
+1/INA	[mm]	0.8	4.0	-3.2		+1/INA	[mm]	7.5	4.0	3.5	
+1/INB	[mm]	102.4	103.0	-0.6		+1/INB	[mm]	110.3	103.0	7.3	
-1/INB	[mm]	8.9	4.0	4.9		-1/INB	[mm]	8.6	4.0	4.6	
-1/MP-abo	[°]	105.7	99.0	6.7		-1/MP-abo	[°]	103.9	99.0	4.9	
Overjet	[mm]	-1.5	3.5	-5.0		Overjet	[mm]	5.5	3.5	2.0	
Overbite	[mm]	0.2	2.0	-1.8		Overbite	[mm]	3.8	2.0	1.8	
Facial Analysis						Facial Analysis					
Ls/E-line	[mm]	0.9	-4.0	-4.9		Ls/E-line	[mm]	0.8	-4.0	-4.8	
Lf/E-line	[mm]	-2.7	-2.0	-0.7		Lf/E-line	[mm]	1.7	-2.0	-3.7	



Fig 3. Pics before Treatment



Fig 5. After 6 months Carriere 3D Motion Distalization

CASE REPORT 2

Female patient age 32 with chief complaints of increased overjet. Patient is highly motivated and compliant. Lateral Cep confirmed Class II Molars with 8mm overjet. Carriere Motion was prescribed for 7 months to improve the sagittal discrepancy and the Class II canines. It was followed by Invisalign to finalize the alignments and improved the anterior overjet. The case totally required 27 months to achieve satisfactory outcomes.

For the Cervical Maturation (CVM) assessment, she belongs to post puberty CVM stage 6 since:

1. ALL C2 - 4 vertebrate lower border show DEEP concavities
2. At least 1 - C3 or C4 rectangular vertical in shape (HEIGHT GREATER THAN WIDTH)
3. Peak Growth should be over years ago.



Fig 6 Pictures Before Treatment



Fig 8. Pictures After treatment

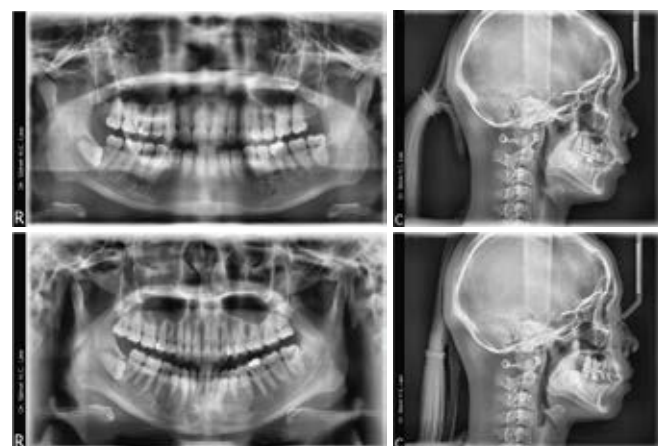
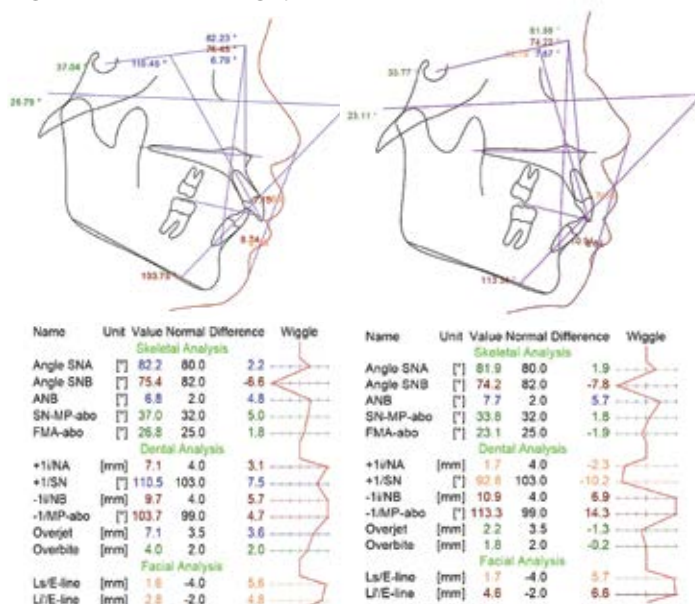


Fig 7. Before and After Radiographies



DISCUSSION

The treatment objectives for Class II Div 1 malocclusion are to improve the large overjet and the deep overbite. Ideally, the molars and canines' relationship should be Class I at the end results treatment. In majority of Class II cases, the upper first molars were rotated mesio-palatally. This would exacerbate the Class II situation by the locking the mandible in a regressive location. The MAF of Invisalign only works well if the wings were strong and rigid enough so that it would work as a functional appliance to correct the bite. It fails if the wings were chew down or broken.

The CMA create a mesial out rotation around the palatal roots of the first molars and enhance the mandible to a forward position as the molars were de-rotating. Also, the lower were extruded due to upward vector pull from the elastics and therefore reduce overbites and promote changes on the occlusal plane. Stage I correct sagittal and stage II correct dental discrepancies. Rodriguez in 2019 reported the long-term sagittal stability of the treatment was good. ⁽⁹⁾

Popowich in 2005 reported for non-extraction Class II patients, the average times Class II elastic wear was about 10 months and 25.7 months for fix appliances. In the CMA sample, the first phase averaged 5.1 months (± 2.8 months), and the second phase with fixed appliances was about 13.0 months (± 4.2 months). The total treatment duration was 18.2 months (± 4.8 months). Therefore, the advantages of CMA treatment were the reduced duration of elastic wear and overall treatment time. ⁽⁸⁾

McNamara et al in 2012 traced 32 patients with serial of cephalograms at 3-time intervals: T1 (initial), T2 (removal of CMA), and T3 (post-treatment). The results were digitized, and superimpositions were constructed to compare the linear and angular variables with untreated subjects who were presented with normal facial profile and occlusions. Variable of ≥ 2.0 mm or $\geq 2.0^\circ$ was used as an indication of clinical significance. They found the nature of treatment effects of CMA are dento-alveolar with only little skeletal changes. ⁽⁴⁾ These findings were also investigated by O'Brien and coworkers. They measured changes in skeletal and dentoalveolar changes used P value of $< .05$ to determine statistical significance instead of change of ≥ 2.0 mm or 2.0° of any cephalometric variables as indicators. However, the limitations of these kind of studies were retrospective nature and the use of historical controls. The mandible is brought forward by heavy elastics that were worn full-time by the patients during CMA treatment. The Co-Gn distance (mandibular length) increases during treatment when compared to normal growth. Nevertheless, there were no statistically significant in the increase of mandibular length. ⁽⁴⁾ O'Brien)

Hamilton in 2013 conducted a survey on 42 CMA patients and 70 patients treated with the fix appliances. The results suggested the CMA group feedbacks were more comfortable and more positive to the overall experience with less negative effects compared to the fix appliance group. In the adolescent patient, the CMA was shown to be more comfortable for the patient to wear, offered a more positive overall experience, and had fewer

negative comfort-related side effects compared with other appliances for Class II treatment. (Hamilton) ⁽⁵⁾ There were no difference in the anteroposterior position of the chin at pogonion between the two groups. ⁽²⁾

Sandifer et al. in 2014 examined the treatment effects of the CMA using two mandibular anchorage protocols: a lingual arch and fixed appliances. There was successful correction of Class II occlusion immediately following the use of CMA, with minimal maxillary molar tipping observed during molar distalization.

Kim-Berman in 2019 found that the SNB angle decrease -0.8° in CMA patients. This decrease in the SNB angle could have been related to the increase in vertical skeletal relationships that occurred in the CMA sample with respect to the controls. There was no difference in anterograde-posterior position of the chin. He also found that the sagittal skeletal changes were similar for the CMA Class II group when compared to the fixed appliance group. There were possible restrictions of maxillary growth rather than mandibular advancement or enhanced growth. There were increased in mandibular plane angle and increase of Lower anterior face height observed. A clockwise rotation of the FOP relative to Frankfort was also reported. ⁽²⁾

Thurzo in 2022 advocated to use personalized custom-made 3D printing device for the manufacturing of the distalizer. These hybrid appliance designs are more aesthetic and increase patient compliance and co-operations. ⁽¹⁰⁾

To Summary the changes observed from CMA treatment:

A. Sagittal Changes in Maxilla

There were no obvious SNA changes for both cases. The Point A to Nasal perpendicular were reduce by 2mm for case 1 while the distance for the Condylion to point A were increased. There were Midfacial length increased in both cases.

C. Maxilla and Mandible Relationship

The Wits appraisal values were mark from 4 to 5mm to zero in both cases. There were slight changes of ANB values 1- 2 degree. The maxillo-mandibular differential, the differences between Co-Pointt A and Go-Gn, increased and moved toward Class I relationship in both cases.

E. Dento Alveolar Relationship

There were net molars improvements for both cases. The overjet improvements were obvious, from 10 to 0mm and 8 to 2mm. The overbites changed from 90 to 10% and 50 to 20% respectively. Proclinations of lower incisors were also noted.

B. Sagittal changes in Mandible

SNB increased slightly in case 1 but were remain unchanged in case 2. The mandibular length Go-Gn increased 4 - 5 mm for case 1 and zero increased for case 2 due to the age of the patient and bone growth had completed. The Pogonion moved anterior slightly.

D. Vertical Skeletal Assessment

The Anterior lower Face height (ANS -Menton) increased for case 1 without significant changes in Mandible plane angles. A clockwise rotation of the functional occlusal plane (FOP) relative to Frankfort horizontal were observed during phase I.

F. Skeletal Relationship

There were reduced forward movements of point A. The Chin point at the Pognion remained the same locations, SNB decreased for both cases. Lower Anterior facial heights increased in case 1. (ANS to Menton)

CONCLUSIONS

1. The Carriere Motion 3D distalizer is efficient and effective for Class II malocclusion correction with less discomfort and increase patient's compliance and co-operation.
2. The effect is mainly dentoalveolar in nature, with changes in molar relationship, overbite, and overjet combined with some lower incisor's intrusion.
3. There were obvious skeletal change and lower anterior facial height increase
4. It is important for case selection since growing child with mandibular growth helps the treatment. It could be used for adults but provides better results for growing teenagers.
5. Mandibular length was not affected by treatment.
6. The pogonion chin point did not move forward due to the increase in lower anterior facial height.

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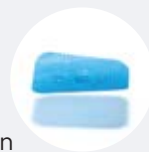


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