Modern Dental Quarterly

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Modern Dental Wins Two Awards

"Future Leadership Summit & Social Caring Pledge Scheme"

Mr. Eddie Ng Hak Kim, SBS, JP, Secretary for Education (8th from the right) presented the "Social Caring Awards for Green Excellence" to the winners.

Modern Dental Group is pleased to announce that the Company has been awarded the "Outstanding Social Caring Organization Award" and Modern Dental Laboratory has been rewarded the "Social Caring Awards for Green Excellence" under the "Future Leadership Summit & Social Caring Pledge Scheme". The awards are a recognition of the Company's active promotion of its corporate social responsibility and environmental protection responsibility.

The "Future Leadership Summit & Social Caring Pledge Scheme" is jointly organized by Social Enterprise Research Institute (SERI) and Asian College of Knowledge Management (ACKM), and is endorsed and recognized by Nobel Laureate Professor Harald zur Hausen. The scheme aims at recognizing the outstanding performance and contribution of Asian businesses and leaders from different industries in areas of environmental protection, human rights, labor standards, anti-corruption and customer care. It invites corporates to sign a memorandum to promise on their continued practice of corporate social responsibility, and to push forward the overall sustainable development of the community and economic growth.

This year's "Future Leadership Summit & Social Caring Pledge Scheme" Award Presentation Ceremony was successfully held on 13 April at InterContinental Hong Kong hosting more than 500 guests. The ceremony was presided by Nobel Laureate Professor Akira Suzuki, who presented the awards and shared with guests his views on environmental protection. The officiating guests of the ceremony included Mr. Eddie Ng Hak Kim, SBS, JP, Secretary for Education; Mr. James H. Lau Jr., JP, Under Secretary for Financial Services and the Treasury; and Most Rev. Joseph Ha Chi-shing, Auxiliary Bishop of Hong Kong.

Ms. Edith Chan, Executive Director and Chief Marketing Officer of Modern Dental said, "We are honored to be awarded the "Outstanding Social Caring Organization Award" and "Social Caring Awards for Green Excellence" under the "Future Leadership Summit & Social Caring Pledge Scheme" this year. The awards demonstrate the market's recognition of our efforts in social corporate responsibility. As a leading global dental prosthetic device provider, Modern Dental Group has been devoted to being a company that cares for the community. We strive to incorporate values and practices of environmental protection and community care in our operations and make a positive contribution to the society. In the future, we will continue to be actively involved in various community-oriented activities, further expand the scope and scale of our participation, and commit to our social responsibility by taking proactive efforts."

Dr. Benedict Foo, Vice Chancellor of SERI and Fellow of ACKM (right) presented the "Outstanding Social Caring Organization Award" to Ms. Edith Chan, Executive Director and Chief Marketing Officer of Modern Dental Group (left)

Intra-oral scanners: A brief overview of the current technology

Being able to accurately capture the anatomical details in the oral cavity has always been one of the most critical procedures. The concept of impression taking was first recorded to be around the early 18th century when Philipp Pfaff described a technique of impression taking using sealing wax softened in hot water.[1] However, the detail of the anatomy captured and distortion was a problem to many dentists.

The next big improvement in the concept of impression taking was the invention of elastic impression materials which were developed by S.L. Pearson at the University of Liverpool in 1955.[2] Later elastic impression materials included polyether, polysulfide and also polyvinylsiloxane materials. The problems of distortions were reduced but the setting time of the material was prolonged and patients frequently complained of an unpleasant smell or taste.

We have now reached the next major milestone in impression taking by utilizing optical technology to digitally capture the anatomical tissues of the oral cavity. Many different brands in the market exists but what are their differences in terms of the technology behind them?

The Technology

The digital workflow currently consists of three main steps. These include data acquisition, data manipulation and computer aided design/manufacturing. All Intra-oral scanners (IOS) on the market today attempt to accurately perform the first step of this digital workflow. To digitally capture anatomical details, different IOS systems utilize different methods for recording the details in the oral cavity. These methods can be broadly classified into laser beam based systems or light beam based systems. Both methods incident a beam on the surface of the tissue and a camera-like device (charge-coupled device (CCD) or position sensitive detector) is used to record the location of the point at which the beam strikes the object. Most software of these IOS systems does the algorithms based on the known position and angulations of the camera and sensors of the scanner.[3]

Laser Beam-Based IOS systems

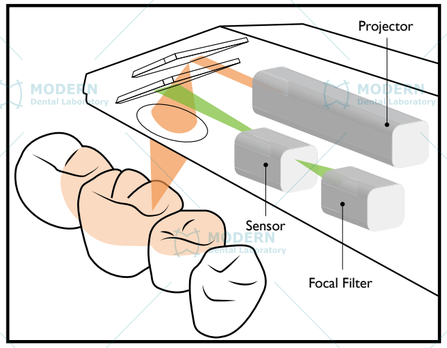
This method of image capturing relies on making still images at different positions which is later rendered into a 3-dimensional object.[4] Since lasers are employed and does not scatter as irregularly as light, it does not require a reflecting agent (Ex. Powder). Two main categories of utilizing laser beam technologies are parallel confocal imaging technique and laser triangulation imaging technique.

Parallel confocal imaging technique (Ex. iTero)

This technique emits 2 parallel laser beams at a specific focal length, which is bounced off the tissue and back through a laser sensor (Fig 1). Before entering the laser sensor, a beam splitter is used to lead the reflected beam through a focal filter so that only the image that lies in the focal point of the lens reaches the filter.[5] Since the focal distance is already set, the software is able to calculate the distance of the scanned object to the lens by moving the lens up and down in the oral cavity.

Laser triangulation imaging technique (Ex. E4D - PlanScan)

This technique utilizes a red laser beam with micro mirrors oscillating at around 20,000 cycles per second to capture a series of still images from multiple angles.[4] The triangulation is done similar to the light based triangulation method described below.



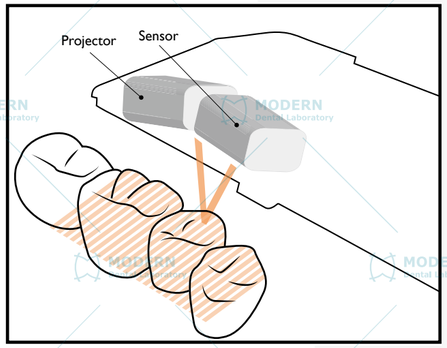
(Fig 1)

Light beam-based IOS systems

This technology of image capturing uses visible light beams instead of lasers. Since light reflects irregularly on different surface characteristics, usually a titanium dioxide reflecting agent is required to create a uniform light dispersion surface. Three main methods utilizes this light beam based technology to capture images.

Active Triangulation technique (Ex. CEREC)

Three linear light sources from the IOS are arranged to locate a given point (Fig 2). The most known user of this technology is the CEREC scanner. Each stripped light pattern represents a capturing point. Since the angle and distance between the project and sensor is known, the distance of the tissue is able to be calculated based on the Pythagoras Theorem.



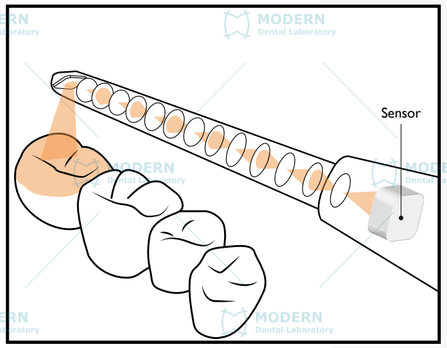
(Fig 2)

Active wavefront sampling technique (AWS) (Ex. Lava / 3M TrueDef)

This method has the ability to capture the 3D data in a video sequence and therefore is a true real time capturing of the anatomy. The light reflected from the tissue is led through the lens system with a specific focal length (Fig 3). If the imagine is clear and in focus, then it matches the set focal length of the lens, from which the software is able to calculate the position of the tissue. The software also is able to compute the distance based on the amount of blurriness in the image. Therefore, this method utilizes the defocusing of the primary optical system to obtain an accurate measurement.[6]

Ultrafast optical sectioning technique (Ex. 3Shape TRIOS)

This method allows the IOS to capture more than 3,000 2-dimensional images per second which is compiled to form a 3D digital image. However, rather than artificially forming interpolated surfaces, it utilizes large volumes of 3D images to create true geometries based on real data.[4] According to a manufacturer which employs this technology (3Shape), this speed of capture is approximately 100 times faster than the conventional video camera. Approximately 130 images are collected into a set that constitutes a voxel volume which is computed and defines the interface between air and tissue material.[7] A major advantage of this scanner is that it does not require the use of any powder.



(Fig 3)

Overview of Intra-oral scanners

Products	Wand Weight (oz.)	Full Cart / Desktop version	Powder (Coating) required	Invisalign integration	Ranking#	
					Accuracy	Precision
3Shape TRIOS	12.3	Both available	✗	✓*	1	1
3M True Definition	8.2	Cart only	✓	✓	4	2
iTero Element**	17.6	Both available	✗	✓	3	3
Planmeca PlanScan	19.2	Desktop only	✗	✗	5	6
Cerec Omnicam	11.0	Cart only	✗	✓	6	5
CS3500	10.4	Desktop only	✗	✗	2	4

* *Invisalign direct integration available in 4th quarter of 2016 according to manufacturer*
** *Not available in the Hong Kong Market (As of April, 2016)*
\# *According to an independent study from the ADA*[8]

Conclusion

We are just beginning to experience the next big game changer in dentistry due to the explosion in digital imaging technology and techniques. An increasing number of commercial imaging companies are developing and cross implementing existing optical technology into the dental field. In the next few years, it will not be surprising if we witness more IOS systems being brought to the market. Eventually, this will likely be a patient-driven demand for their clinicans to incorporate this technology into their practice. Integration of this technology into dental practices will be a certain eventuality in the next decade.

References

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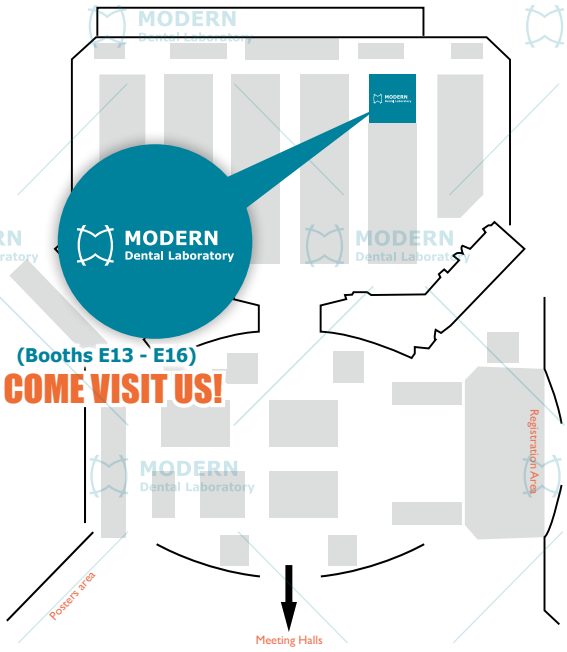
Article prepared by: Dr. Ronald Chan

The 38th Asia Pacific Dental Congress

38th APDC2016
17-19 June • Hong Kong

Modern Dental Laboratory is glad to be one of the exhibitors in The 38th Asia Pacific Dental Congress (APDC). It will be held at **Convention Hall of the Hong Kong Convention and Exhibition Centre between 17th - 19th June 2016, opening from 9:00 a.m. – 6:00 p.m.** We are now inviting you to visit us at **Booths E13 - E16** to see our product showcase and the demonstration of scanner technology. Coupons and souvenirs will also be distributed in our booth. We are looking forward to seeing you there!



The event invitation card has been mailed together with this quarterly. You will get a free registration to the exhibition showcases by showing this card. If you would like more copies, please feel free to contact our sales and marketing team.

New Product leaflets have been released!

We are releasing three new product leaflets for you and your patients. Patient versions are created with layman terms for your patients to read in the reception area.

• *Resure Partial Denture (Patient version)*

• *Mandibular Advancement Device (Doctor version)*

• *Sport Guards (Patient version)*

If you would like more copies for your clinic, or have any inquiries about the product, please feel free to contact our sales team at **+852 3766 0783 – Ms. Jasmine Cheung** or **+852 3766 0760 – Mr. Daniel Chok.**

DentiHK

We are pleased to sponsor this dental mobile app which summarizes all dental related seminars in Hong Kong. Download it today!

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Quarter 3 Seminars in 2016

Modern Dental Laboratory is glad to announce that we are going to launch another series of evening seminars in the upcoming quarter focusing on model pouring workshop and endodontics. This is a great chance for you to update dental knowledge and meet our technician experts to exchange dental ideas. Please save the date and register now! Space is limited. Details as below:

	Model Pouring Workshop	Endodontics Simpified
Date	2nd September, 2016 (Friday)	22nd July, 2016 (Friday)
Time	17:00-18:30	19:00 – 21:00
Location	Digitek Dental Solutions Office (Lai Chi Kok)	Modern Dental Laboratory Office (Lai Chi Kok)
Max Participants	15 DSAs (*The workshop may be postponed to next quarter if the number of attendants is less than 5.)	15 Doctors
Speakers	Raymond Ho & Amanda Li	Dr. Jeffrey Chang
Content	A workshop which will teach dental assistants to improve their technique of pouring a stone model from an impression. Demonstration will be given by our technicians, followed by hands-on practice from participant.	Root canal treatment has evolved over the past few decades with massive changes in the instruments and materials we use in endodontics which can be quite confusing for new practitioners. This talk will try to simplify the commercial jargon exemplified by various commercial entities and the economics of endodontics to facilitate a standard of care in endodontics.

For further information or enrollment, please contact our marketing team at **+852 3766 0781 – Ms. Erica Kwan.**

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