

Towards a Contemporary and Reasoned Orthodontics: An Interview with Dr. Chris Chang

Introduction

This interview was conducted by Dr. Stéphane Renger before Dr. Chang's lecture in the annual Prestige Day of the French Society of Dento-Facial Orthopedics (SFODF) and was originally published in the Journal of French Orthodontics (L'Orthodontie Française) in 2018 in French.¹ It was translated to English by Dr. Stéphane Renger and reprinted with permission. (J Digital Orthod 2020;59:78-88)

Stéphane Renger: Dr. Chris Chang, on March 28th, 2019, you will be the prestigious speaker for the annual Prestige Day of the French Society of Dento-Facial Orthopedics (SFODF). It is a great honor for us that you accepted this invitation to share your experiences in orthodontics with French orthodontists. Before the event starts, we are happy to discuss various subjects and exchange some aspects of your work in order to get to know you better.

The Path Taken

Stéphane Renger: First, could you please describe the first step that guided you through your incredible professional career?

Chris Chang: I was born in a small humble village in the countryside in Taiwan, and I had never really worn shoes before I started school. In the whole village, people only spoke a local dialect and I was

not known for being a good student! The most important thing that I learned in primary school was not to make any trouble or get into trouble! At school, there was not much to learn, so I had time to learn on my own, for example, to kill and skin frogs! This was the start of my self-teaching process, which continues until now: how to identify and solve problems. I have no memory of learning anything in primary school, but I do remember I was the "Head of Cleaning." I always aspired to be the class leader, but my teacher insisted that I remain the head of hygiene, which I obviously must have excelled in!

My education in junior and senior high school, however, was very different. I attended a rigorous Catholic private school where most of the students from the area were all much smarter than I was. This is the place where my personality was shaped and formed, and it was when I became very disciplined (Fig. 1).



Stéphane Renger,
Member of the Board of Directors,
The French Society of Dento-Facial Orthopedics

Stéphane Renger: What was the motivation that made you choose the career in orthodontics?

Chris Chang: The motivation to become an orthodontist was a bit special. At first, I was not really interested in becoming a dentist, even though I had attended dental school. I had applied for a teaching position in the anatomy department, but, when my prosthodontics professor found out, he wouldn't allow me to continue on this path. He explained to me that I had a gift and talent in orthodontics. I had no real interest in learning orthodontics, due to the way it was taught, but my professor told me he would make it happen!

So I started studying Dr. Angle's publications



■ Fig. 1: 12-year-old Dr. Chris Chang in junior high school

and attending Charlie Burstone's conferences of biomechanics where I learned that preparation was the key to success! I was well-prepared for his conferences. I understood what he was talking about and I could even answer questions from other participants.

The last hurdle to overcome was trying to convince my father to pay for my tuition fees in the United States, which was almost the entire life savings of my working-class family.

Stéphane Renger: What motivates you to be so active in your profession?

Chris Chang: I think that it is a mixture of my background, education, the difficulties I encountered, and the results I obtained. All of these are the engine of my professional career and my enthusiasm for teaching. As I found that it is so difficult to become an orthodontist, I've made a vow to pass on the knowledge which I finally understand, and to make it easier for others to acquire it.

Stéphane Renger: Did you have or do you still have mentors, people who help or support you in your professional career? If so, what did you learn from them?

Chris Chang: My first mentor is a Taiwanese doctor called John Lin (Fig. 2B, left). He has continued to



Fig. 2: Dr. Chris Chang with his mentors: Dr. Charlie Burstone (A), Dr. John Lin (B, left), Dr. Eugene Roberts (B, center), Dr. Dwight Damon (C, center), and Sandra Diver (C, right)

inspire me even till today. He has taught me two very important things: the passion for learning and the passion for teaching.

Charlie Burstone (Fig. 2A) is another mentor of mine, who taught me how to appreciate the beauty of biomechanics.

Gene Roberts (Fig. 2B, center) was my mentor at Indiana University and is still my mentor. Most importantly, I refer to him as my godfather. This great man has taught me virtually everything I have needed to survive in this great profession.

Dwight Damon (Fig. 2C, center) is another mentor who has opened my eyes to the possibilities of using new techniques and a different philosophy towards old problems.

Last but not least, Sandra Diver (Fig. 2C, right) has given me the opportunities to speak to a large audience and has coached me to be able to lecture

all around the world.

This list could go on forever, as I think that everyone can be my teacher, but those listed above are of the most importance.

Furthermore, please have a look at my YouTube video entitled “Three Life Lessons” and this will help you to further understand my philosophies on learning and life (Link 1*).

Stéphane Renger: Do you also have mentees? I read your journal, Journal of Digital Orthodontics (JDO), with free internet access. There are many young orthodontists working with you and publishing articles regularly. Are they your students? Are you working with them?

Chris Chang: Yes, I have many mentees, and most of them work together with me in the same practice. However, I love to teach doctors who are passionate about learning, and I also like to make it easier for

* All videos mentioned are linked at the end of this interview.

them to excel in our beloved profession.

I am really happy to see my students publishing so frequently with such enthusiasm.

Temporary Anchorage Devices (TADs)

Stéphane Renger: TADs or, more specifically, miniscrews (Fig. 3), have become very popular among orthodontists. When appropriately used, they improve the quality of treatment and open up new treatment alternatives.

However, it has been reported that the average failure rate of the miniscrews is 16.4%.² Such rates discourage many orthodontists and prevent them from taking advantage of these devices.

Chris Chang: Please take a look at my publication on the success rate of TADs, "A Retrospective Study of the Extra-alveolar Screw Placement on Buccal Shelves."³ The failure rate is actually very low (7%). This has to do with the methods.

Stéphane Renger: You did a Ph.D. in bone physiology, and you published a great number of articles on this subject. I guess your success rate is much higher. Could you please give us, on the base of your expertise, a few advice to improve the success rate and to help convince orthodontists to use them?

Chris Chang: My success rate is about 93%. More details are illustrated in my article, "Primary failure rate for 1680 extra-alveolar mandibular buccal shelf mini-screws placed in movable mucosa or attached gingiva."⁴

The proper method is the key. You will be able to find the answers in the YouTube video titled "Failure Rate for Buccal Shelf Screws" (Link 2). Everything is there!

Stéphane Renger: Concerning the primary stability of TADs, the bone-implant contact is the key point. Do you think that TADs are partially osseointegrated? Is there any sign of osseointegration after a long period in the mouth?

Chris Chang: No, I use non-osseointegrated screws made of stainless steel. My primary stability is based on mechanical locking with the bone, so the key is bone density.

Stéphane Renger: Ideally, miniscrews should be designed to enhance their holding in the bone.

"Design is not just what it looks like and feels like. Design is how it works," said Steve Jobs.

Could you tell us what would be the qualities of TADs in terms of design and material?

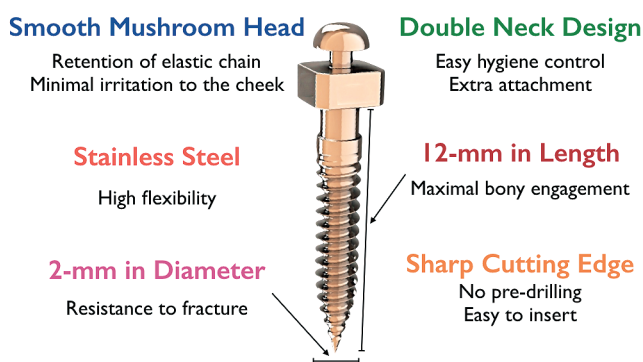


Fig. 3: Special design of the orthodontic bone screw (2x12-mm stainless steel)

Do your OBS screws have a special design related to diameter and length, thread and shaft design, fluting, surface treatment, etc.?

Chris Chang: This is a very good question. I can talk to you about this for hours.

My OBS screws have all of the mentioned features (Fig. 3). Please look at my YouTube video titled "OBS TAD applications" (Part 1: [Link 3](#); Part 2: [Link 4](#)).

It took me 5 years to design and test this screw and, according to my experience, this is the best weapon that I have ever had.

Most screws are designed by engineers, but mine have been designed by a practicing orthodontist and tested by the same experienced orthodontist, which has helped to eliminate all possible variabilities.

Stéphane Renger: Do you always use self-drilling screws? Hung et al.⁵ recently evaluated that initial drilling reduces the associated trauma when inserting the miniscrews into the bone site.

How do you control your insertion torque value during insertion and removal?

Do you believe that insertion torque is the key to TADs success?

Chris Chang: I always use self-drilling screws, 100% of the time. Self-drilling gives you the sense of bone quality. Initial trauma is not as important as bone

quality. One has to learn to follow one's instincts. The success rate of 93% justifies my gut feeling!

If the bone quality is not good enough, the answer is easy: find another place with better bone quality!

Stéphane Renger: As previously indicated, the anchorage of a miniscrew depends on its interaction with the surrounding bone into which it has been inserted. In your experience, what are the best insertion sites?

Chris Chang: The best insertion sites are the infra-zygomatic crest (IZC) for the upper arch (Fig. 4) and the mandibular buccal shelf (MBS) for the lower arch (Fig. 5).

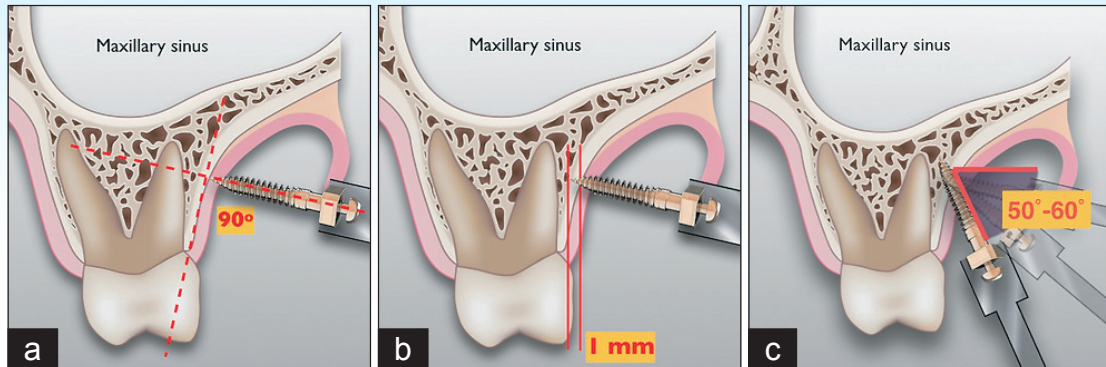
Stéphane Renger: How do you evaluate cortical bone thickness before insertion? In which cases do you consider that a CBCT is needed?

Chris Chang: I don't need to evaluate the cortical bone thickness. I can sense it during insertion. I only use a CBCT after insertion, to check how much cortical bone has been engaged and/or to check for sinus perforation.

Stéphane Renger: Do you use TADs in most of your cases? What is the percentage of cases you use TADs in young patients and adults?

Chris Chang: No. When the case needs it, I use it, but only if there is no other minimally invasive alternatives.

My goal is to be as minimally invasive as possible. I don't use OBS screws just because I designed it and



■ Fig. 4:

(a) 90° orientation of the IZC screws is shown at the start of the installation procedure. (b) The approximately 1mm bone plate is penetrated on the buccal surface. (c) The axial inclination of the screws is progressively increased about 50-60° as it is screwed into place.

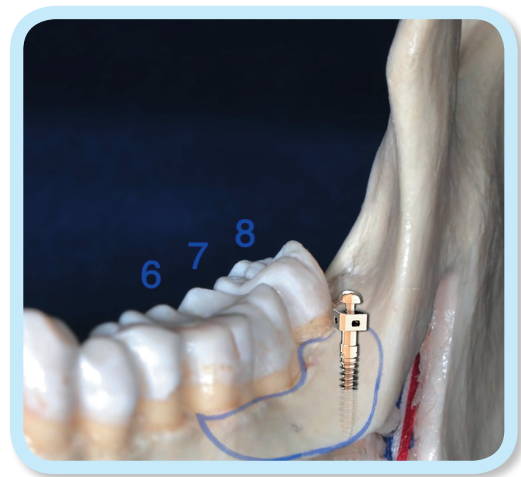
wish to sell more of them. I use them in about 30% of my young patient cases and about 45% of my adult cases.

When reading these percentages, please bear in mind that:

1. Asians tend to suffer more from crowding and bimaxillary protrusion than Caucasians.
2. Most of my cases have been referred to me, especially a lot of impaction cases, so my percentages tend to be higher than other orthodontists.

Stéphane Renger: I saw a beautiful case treated with a vertical miniscrew inserted in the mandible in your publication. You suggest inserting screws between the first and second molar with about 20°-30° angulation in the mandibular buccal shelf (MBS) region, and 5-7mm below the alveolar bone crest with a specific technique (Fig. 5).

Could you please explain how do you insert the miniscrews in these sites? What type of screws do



■ Fig. 5:

The best insertion site: mandibular buccal shelf (MBS) region for the lower arch

you use and how to avoid any torsion, slippage of the screw, or injury of the soft tissues? Do you use (digital) surgical guide in some difficult cases?

Chris Chang: It's easier to learn from videos than texts. Please have a look at my YouTube videos on how to put screws in anterior position, buccal shelf, and palate (Links 5-7). These show how to use

the screws and tips for insertion. I have never used a digital surgical guide.

Stéphane Renger: Do you usually find enough labial bone to insert vertical miniscrews in maxillary buccal areas? If not, where are the ideal insertion sites?

Chris Chang: In 99% of my cases, I insert TADs in the IZC and the lower buccal shelf.

Stéphane Renger: In your opinion, is the palate a good insertion site?

Chris Chang: I rarely insert into the palate, as this irritates the patient's tongue and affects their speech. Orthodontics should be as minimally invasive and as comfortable for patients as possible.

Stéphane Renger: Do you insert the same type of screws under the mucosa (*for example, infra-zygomatic crest sites*)?

Chris Chang: Yes. The key is to stretch the mucosa when inserting so as not to tangle the mucosa.

Stéphane Renger: At which standpoint do you decide between "en masse" retraction of the entire maxillary dentition or sectorial retraction?

Chris Chang: I am a student of Charlie Burstone; therefore, I always do en masse retraction. I love Charlie!

Stéphane Renger: For these Class III patients with en masse retraction, in which cases could you anticipate a higher success rate or a higher risk of failure?

Chris Chang: For Class III non-extraction patients, I use whole arch distalization with MBS screws. If the lower incisors are flared out, this is an easy case. If the lower incisors are retroinclined at first, then it is a more difficult case. You need to use high torque brackets on lower incisors.

Stéphane Renger: It is common knowledge that it is more difficult to distalize molars in patients with hypodivergent faces: do you experience these difficulties?

Chris Chang: Yes, of course. However, fortunately short faces are not so common in Taiwan. Therefore, I seldom have such difficulties!

Stéphane Renger: While there are various reasons why orthodontists do not place their own miniscrews (*Buschang et al.*⁶), the most common reason is the risk of root damage. The risk of root damage was deemed to be more important than time, training, pain, or the availability of a kit. What are your views on these statements?

Chris Chang: To avoid root damage, I place the miniscrews in the IZC and MBS, outside of alveolar process, as there is plenty of bone in both areas, resulting in good anchorage and obviously no root damage. Besides, I use self-tapping screws, so if the screws were too close to the roots, both the patient and I would feel that, and the route of insertion can be changed.

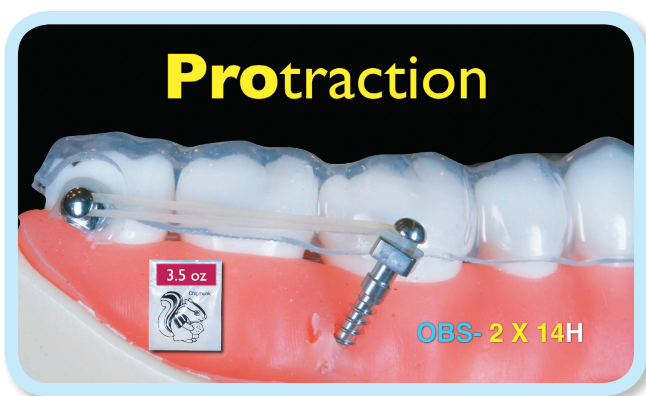
Stéphane Renger: Before inserting miniscrews, the CBCT examination (*short field*) is recommended

if usual radiographic examinations show a risk of complications (*root proximity or variations in the root anatomy inadequate bone*). In which situations do you use this kind of examination prior to inserting your screws?

Chris Chang: I don't need a CBCT prior to starting the treatment; a visual check is sufficient. It really is an easy procedure once you know how to do it. However, I do use CBCT after insertion to check, for my own studies and research.

Stéphane Renger: You show us wonderful cases treated with IZC bone screws, which are extra-alveolar skeletal anchorages. They always stay under the soft tissues. What type of connections do you use between them and the dental units?

Chris Chang: I use power chains to connect the screws to the dental units for retraction and protraction cases (Fig. 6).



■ **Fig. 6:**
A screw is connected to the third molar by elastics (or power chains) in a protraction case.

Stéphane Renger: In case of connection with lever arms between IZC bone screws and dental units, how do you connect the lever arms to the head of the screw?

Chris Chang: I only use lever arms for impaction cases and these need to be designed to the force vector according to the specific situation of the impaction (Figs. 7 and 8).

Normally the vector would be outward, backward, and downward. I connect the lever arms into the 0.022 x 0.027" rectangular hole in the screw platform using a 0.019 x 0.025" stainless steel (SS) wire.

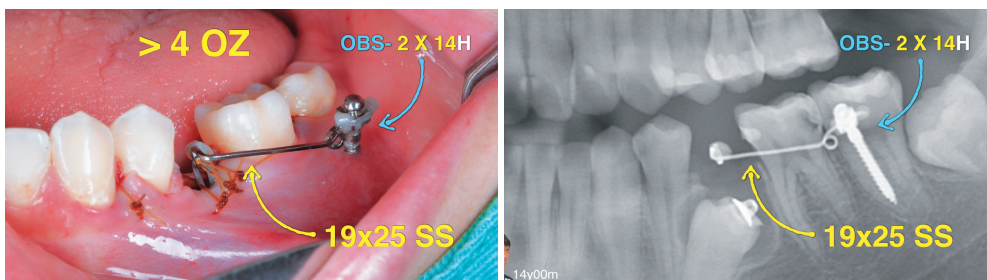
Stéphane Renger: Do you always do the surgery yourself or do you sometimes delegate to surgeons?

Chris Chang: If the case is simple, routine, and time is of the essence, I will sometimes delegate to other surgeons who work in my practice. If the case is a difficult case, then I will prefer to perform the surgery on my own.

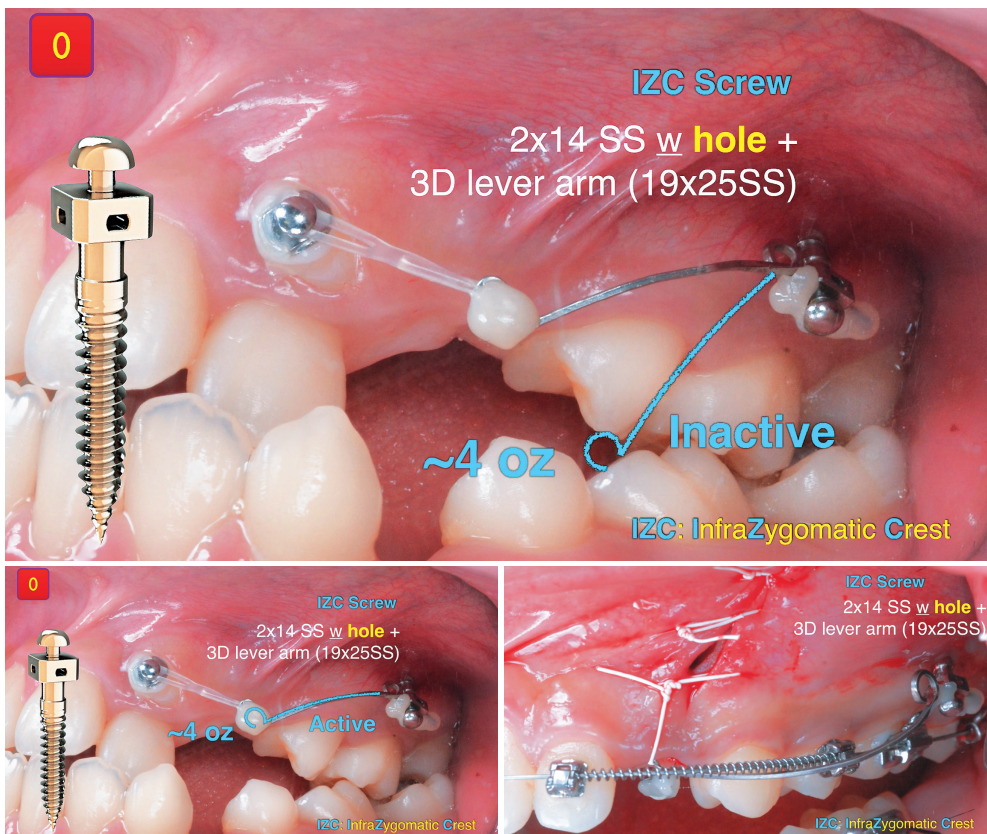
Stéphane Renger: Is the percentage of extraction in Taiwan lower today than 20 years ago? Do you think that new technologies like TADs could explain the decrease of the percentage of extractions?

Chris Chang: Yes, because TADs can distalize the arch backward. Besides, the Damon system I use is very efficient for solving crowding, which, however, can sometimes procline the front teeth too much. TADs can prevent this side effect. Therefore, the Damon system and TADs are a wonderful combination.

Stéphane Renger: Dr. Chris Chang, you have had enormous experience and treated a considerable number of patients in your clinics, and the most important of which is your “Beethoven Orthodontic Center” in Taiwan. What are the most challenging cases in orthodontics in your practice?



■ Fig. 7: A level arm used to treat a lower impaction case



■ Fig. 8: A level arm used to treat an upper impaction case

Chris Chang: Currently, my most challenging case is answering your questions! Seriously, though, I think the most challenging cases are picky patients, unless they're beautiful ladies.

Stéphane Renger: Your YouTube video, "Class III amazing case" (Link 8), has more than 1.7 million views! It shows, for patients treated, the possibility of orthodontic correction that, at first sight, had to be treated combined with surgery (Fig. 9).

Do you think the use of TADs enlarges the scope of your treatment plans when you don't want to do extractions or orthognathic surgery?

Chris Chang: Of course. That's why I use them!

Stéphane Renger: In cases where the the treatment plans depends only on the use of TADs, how do you inform the patients that the treatment plan has to be changed in case of TADs failure?



■ **Fig. 9:** "Amazing Class III Open Bite" on Youtube (Link 8) shows the treatment progress of a Class III case, which reaches over 1.7 million views.

Chris Chang: If you think you might face this issue, it is always better to inform the patient before starting the treatment. For me, it is not a big issue. I always tell the patient that I will try my best. I never make a definitive promise.

Looking Ahead

Stéphane Renger: Do you perform statistical reviews and for what purposes?

Chris Chang: I am currently conducting research on the failure rates of different miniscrews and the analysis of the factors that contribute to these failures. I hope this work will bear fruit and be useful to professionals who use skeletal anchorage to treat patients.

Stéphane Renger: How do you see our profession in the future? You often quote words from Steve Jobs, whose ultimate message to the world was "your time is limited, so don't waste it living someone else's life. Don't be trapped by dogma - which is living with the results of other people's thinking ... Have the courage to follow your heart and intuition." How could you link this statement to your philosophy of treatment in orthodontics?

Chris Chang: The future is digital orthodontics. I apply this minimalist philosophy both in my private and professional life. With the help of digital orthodontics, I think it will be easier to treat our patients with the least invasive approach possible. I adhere to this minimalist philosophy by being as minimally invasive as possible for all my patients.

I think everyone should follow this wave - Digital Orthodontics - as well as everything that the digital world can bring us in general. Today, in my practice, I only use digital tools: the Insignia® system for fixed devices and Invisalign® for removable devices.

Stéphane Renger: Thank you very much, Dr. Chris Chang, for all your answers and all these beautiful references and links to many of your YouTube videos! It was a real pleasure to chat with you on this occasion.

Chris Chang: I hope I have answered all your questions well, while waiting to meet you all during the next SFODF Prestige Day in Paris on March 28, 2019!

References

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2. Schätzle M., Männchen R., Zwahlen M., Lang N. P. Survival and failure rates of orthodontic temporary anchorage devices: a systematic review. *Clin Oral Implants Res* 2009;20(12):1351-59.
3. Chang CH, Roberts WE. A retrospective study of the extra-alveolar screw placement on buccal shelves. *Int J Ortho Implantol* 2013;32:80-89.
4. Chang CH, Liu SS, Roberts WE. Primary failure rate for 1680 extra-alveolar mandibular buccal shelf mini-screws placed in movable mucosa or attached gingiva. *Angle Orthod* 2015;85(6):905-910.
5. Hung E, Oliver D, Kim KB, Kyung H-M, Buschang PH. Effects of pilot hole size and bone density on miniscrew implants' stability. *Clin Implant Dent Relat Res* 2012;14(3):454-60.
6. Buschang PH, Carrillo R, Ozenbaugh B, Rossouw PE. 2008 survey of AAO members on miniscrew usage. *J Clin Orthod* 2008;42(9):513-518.

Links

1. Chris's 3 Life Lessons - <https://youtu.be/1EWcvCr3KHQ>
2. Failure Rate for Buccal Shelf Screws - https://youtu.be/kTSM6hS_iyg
3. IZC Screw - Angle Society 2017 Part 1 - <https://youtu.be/u2nZf5dQyLM>
4. OBS TAD applications Part 2 - <https://youtu.be/FTgvqB1nrF4>
5. How to Put OBS 1.5 at Anterior Position - <https://youtu.be/UokxZlqle64>
6. OBS-2. Buccal Shelf - <https://youtu.be/EFoYex0KXS4>
7. OBS-3. Palate - <https://youtu.be/JQUdmIJDMye>
8. Amazing Class III Open Bite - https://youtu.be/LJO8Xmw_czA

