

The past one and a half years have not been an easy journey. When I first won the IFIC, I was all hopeful and eager to commercialise my product. But as a fresh Year 2 undergraduate then, I knew little about the market and technical challenges that were coming my way. First forward today, and after many pivots, my biggest takeaway from this journey transcends beyond the scope of MSE. Not only am I more aware of both the business and technical aspects of product commercialisation, but I have also found a deep passion for entrepreneurship.

Bitez: June 2020 – November 2020

To date, I am still grateful for the opportunity which I have been given in IFIC. After winning the competition with Bitez (a smart denture that monitors chewing difficulties), I went on to compete in “The James Dyson Award” (JDA). All bright-eyed and confident, I naively believed that I would continue to win competitions with the same innovation. However, the outcome was not great, which prompted me to re-evaluate the idea.



Post-JDA, my first steps were to validate my technology with a dentist. Well, that's when I learnt that a school research project and a market product have their vast differences. Dentists believed that Bitez was WAY too over-engineered for its use case. Firstly, chewing difficulties in denture patients can be overcome in weeks with proper training. Secondly, it is a problem that both dentists and patients have learnt to live with. In other words, it is not a major pain point that either party wants to solve. Thirdly, even if Bitez help patients to track their chewing patterns, a considerable amount of effort is needed to re-adjust one's chewing habits.

Henceforth, upon the suggestion of a young dentist, I eagerly pivoted to my second idea, Bruxol. However, it was not without its challenges as well.

Bruxol: December 2020 – June 2021

Bruxol is a smart nightguard that monitors sleep bruxism patterns among teeth grinding patients (**post-diagnosis**). It is a condition that about 10% of the world suffers from. However, in today's world, there are no reliable means of monitoring sleep bruxism. To follow-up on the condition, patients usually have their spouses or loved ones listen for biting sounds at night. Other modes of monitoring include the inspection of teeth wear by dentists or basic questionnaires to identify causes of teeth grinding (e.g. stress).

The idea was well-received by both NTUitive and bruxism patients alike. Not only was the technology groundbreaking, but there was also an actual pain point to be solved (unlike Bitez). My team and I (consisting of 3 electrical engineering students, 1 mechanical engineering student and myself) then worked day and night, trying to develop the product. Things got serious for me as I was certain of dwelling in entrepreneurship for years to come.



But that's when our team hit the first major roadblock. As we go deeper into the development, we realised that there were more technical challenges than we could chew.

Firstly, our team knew little about medical device regulations. It was only after I took a course on ISO 13485 (QMS for medical devices) then I realised that we had left out a large chunk of consideration. As there are no other electronic oral devices that are used overnight, getting our product approved would have a unique web of complex challenges. Secondly, there was a BIG reason why there were no similar market innovations. Using piezoelectric/ capacitive/ resistive pressure sensors for biomedical purposes is in its infant stages. While much of the world is still researching on this subject, our team had tried to jump the gun in commercialising a product.

However, these technical roadblocks could be overcome with much grit, and I was only somewhat affected by them.

In May 2021, our team was sent by NTUitive to the Singapore Lean Launchpad Programme. It was an initiative for early-stage start-ups to validate their product with the real-world market. As Bruxol was tackling a real pain point, we were confident that our technology would be well-received. However, in the first month, our team was taken aback by a rude shock.

Upon validating the idea with senior dentists, Bruxol was poorly received as well. While it had a valid problem statement, there was a poor problem-solution fit. In other words, while detecting grinding patterns may help in post-diagnostic monitoring of sleep bruxism, the treatment would not have differed much. Today, there are barely any reliable treatments for sleep bruxism, except to mitigate stress or to put on a nightguard. With or without the monitoring data from Bruxol, there are hardly any effective measures that dentists can adopt to stop teeth grinding.

Henceforth, this has taught our team another painful lesson: A valid solution must not only tackle a theoretical pain point, but it should consider all current practices in the market and **fit timely** into any real-world gaps. **Too early and there is little that consumers can do with the technology.**

Nonetheless, Bruxol was still an interesting research project worth exploring and I have adopted it as part of my Final Year Project.

Uncertain times: July 2021 – August 2021

For the next two months with the Singapore Lean Launchpad Programme, our team struggled to revive a new problem & solution. This time, I decided that I should not restrict my mindset to an MSE-related product. The market is unforgiving. It does not care how technologically advanced our product is as long as we provide a valid solution for a valid pain point.

Hence, we started from the fundamentals. As the dental industry is filled with inefficiencies, our team decided that it is still a space worth exploring. We interviewed over 20 dentists, hundreds of patients, 3 MedTech regulators and a handful of engineers. We want to have a holistic view of a perfect problem to tackle, as well as a strong, executable solution.

Finally, after 2 gruelling months, our team discovered that at the baseline, dentists are facing problems with poor patient retention – due to low dental urgency and awareness.

So what might the solution be?

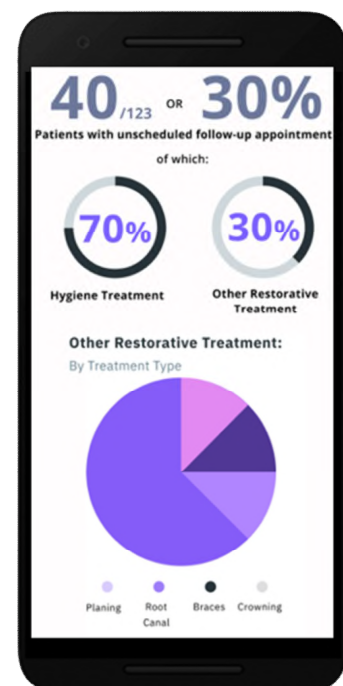
OraHub: August 2021 – Present

Nothing too fancy. It is simply a mobile application. However, it is a mobile application that considers the market needs and landscape.

OraHub is a smart clinic outreach platform that empowers both dentists and patients.

On the dentists' end, they can improve their digital influence on patients through various connectivity tools (e.g oral health analytics, reminders, chatbot, etc.) Through these interactions, we analyse data on patients' dental visit behaviours and out-clinic activities. This enhances dentists' abilities in understanding patients better. As such, they (with the guidance of OraHub) can create personalised outreach strategies to improve patients' urgency and retention.

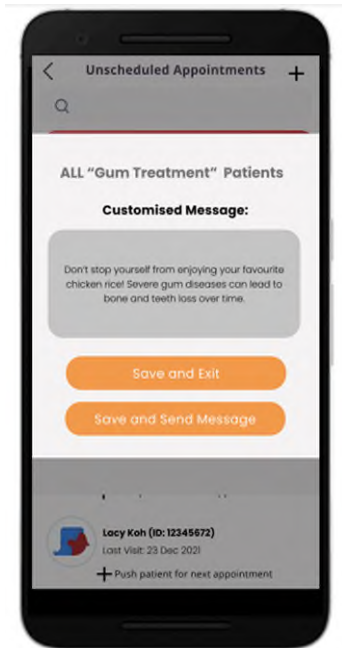
On the patients' end, the connectivity tools provide them with a convenient avenue to track their oral health progress and statuses. Based on our interviews, 78% of patients claim that



stronger transparency and convenience in their dental journey can motivate their oral health urgency.

Although OraHub is still a fresh start-up, our team is delighted to have received largely positive feedback from both dentists and patients. Furthermore, we are heartened to receive considerable amounts of investments from angel investors.

To date, my team and I are on an exciting journey in software development. We have received several letters of interest from dentists and are planning to launch the application in May.



Conclusion

Hence, to reiterate my biggest takeaway: To dwell in entrepreneurship, one should not fall in love too much with the solution. Rather, I have learnt the hard way to take a step back and to thoroughly analyse the needs of the market. Sometimes, innovation does not have to restrict itself to technology.

A simple piece of software can also re-write current industrial practices – to make them more effective and efficient. After all, the voice of the customer comes first, and they decide what is a compelling solution!