[00:00:00] [singing] *It's time for meaningful insights, every researcher's delight, it's data night! [end singing].*

Interviewer: Hello, and welcome to Data Night with the Odum Institute. I'm your host, Kasha Ely, and with me today is Pegah Kamrani, a doctoral candidate at the UNC School of Dentistry. Hi, Pegah.

Pegah Kamrani: Hi Kasha, thank you so much for having me on your show and such an honor to be here speaking with you today.

Interviewer: Thank you so much for joining us. We're so excited to have you to talk about all the exciting things that you're doing right now. I know it's been an especially exciting last couple of weeks, but before we chat about that, I wanted to start off by asking what brought you to the UNC School of Dentistry?

Pegah Kamrani: Yeah, so I grew up in Chapel Hill and I, you know, knew in high school that I wanted to go to dental school. I knew that I had a really good relationship with my orthodontist, given all the expensive treatment that I had done, and I was fascinated with my diagnosis as a child and the treatment I was receiving, and I looked up to my orthodontist as a really good role model, and basically it was just, I knew that that was my passion, and I knew that dental school was, you know, going to be the next step after undergrad to pursue that, and UNC is also, UNC was my top choice because it is one of the top schools in the nation. "We're always striving to go beyond excellence" is what our motto is, and I really do think we try to do that, so I was proud and honored to be accepted and to be doing my [00:02:01] dental school career here.

Interviewer: And you're not new to Chapel Hill. You grew up here. Correct?

Pegah Kamrani: Yes, I grew up here. I've been here since kindergarten, and I did leave for college. I went up to Columbia in New York. Part of that was because I do enjoy running, so I actually ran at Columbia, and I enjoyed that freedom of the division one experience along with not having the pressure of an athletic scholarship, so I can, you know, really focus on my studies. But yeah, so that was a great experience for me, and after my four years in New York, it was just really a natural progression for me to come back home and to be in Chapel Hill closer to family and to attend one of the best schools in the nation.

Interviewer: And you are in the third year of your four-year degree at the school. Correct?

Pegah Kamrani: Yes. I am in my third year, [00:03:01] I guess you could technically say I'm a fourth year now. I'm not, you know, not everyone is totally entirely sure at what point we call ourselves fourth years because the fourth years graduated. They graduated a few weeks ago, so if we kind of get a little technical, I guess I'm considered a fourth year, but if the fourth year starts in the fall, then I'm still a third year, but yeah, but I'm planning to graduate May 2021.

Interviewer: That's so exciting. You're so close. Even though I'm sure this year has looked a little different than you expected it to, but it sounds like you're still going strong.

Pegah Kamrani: Yeah, it definitely has been different. A lot more online classes in online learning. We're planning to start back up in August, and I hope that doesn't get pushed out any further. You know, I'm really really missing my patients, [00:04:01] and I hope that they're, you know, all doing okay. I also miss my classmates and, you know, the faculty and staff, so I think everyone will be really happy and excited to start back up in August, and I think I think we'll be able to do that. I think they're planning to make some modifications so that we're not all in the clinic at the same time so there's, you know, less people together, one, less aerosols being generated, but still, you know, allowing some students to get that clinical experience. So, you know, it's a trade-off, but I think we'll all adapt and be okay.

Interviewer: Great. It sounds like from when we were talking earlier that you've experienced a lot of support -- seems like a good community to be a part of on campus. Now, recently you won the International Association for Dental Researcher’s 2020 Junior Craniofacial [00:05:01] Biology Award for your work studying class 3 malocclusions. Just to let our listeners know, this is an international award recognizing original and outstanding research on craniofacial growth and development, so that's definitely huge. How does it feel?

Pegah Kamrani: It feels really, you know, it feels wonderful. It is... it's been kind of a two-year project in the making, but it really, it really highlights how interesting our work has been to those, you know, in the field and just how, you know, relevant it actually can be, you know, in the future.

Interviewer: Can you tell us a little bit about what the project is addressing?

Pegah Kamrani: Yeah. So the class 3 malocclusions, in simple layman's terms, is an underbite, so it is when your lower jaw is in front of your [00:06:01] upper jaw, so your lower teeth will be in front of your upper teeth, and it's, you know, it's not super common. It affects about less than 5% of the population, but it is a challenge for the orthodontist to diagnose properly and to treat and to consider the patient's prognosis of, it's the treatment I'm providing to this patient. Is it going to succeed? Is it going to fail? Those are tough questions that orthodontists deal with daily when treating class 3 patients, so this project has a very deep history, and it starts with my mentor, Dr. Frazier Bowers, at the UNC School of Dentistry, and I should say the UNC Adams School of Dentistry. We have a new name, and I approached her in 2018, and I expressed my interest in this subject, and I knew that [00:07:01] she had done work in the past in the early 2000s on this subject, and we were able to think about and propose this project's design together. So, for those of you that don't know, Dr. Fraiser Bowers is a orthodontic professor at the UNC Adams School of Dentistry. She treats patients. She also teaches the residents at our, at the residency program, and she is the assistant dean for inclusive excellence at the dental school. So, yeah, so she's got a lot of roles going on, but she also has a research lab, which is great, and so in 2006, she, along with a number of other professors at school and a resident, they identified 5 predominant subtypes, the class 3 malocclusion, it comes in many forms. So, their study identified 5 main forms of this deformity [00:08:02] using just measurements from an x-ray called a SEF, which is a very commonly used X-ray that orthodontists take as part of their diagnosis and treatment planning for their patients, and so after they identify these 5 predominant subtypes in 2006, a few years later, they proposed the question of: for any given class 3 patient, for their measurements, can we input it into a mathematical model and have the model assign them their subtype? So, the model uses these patients from their first study as the training data, so then for any new patient, we would input their measurements and have the model tell us what subtypes they are, and so it's, it is a machine learning approach. [00:09:03] We consider it supervised learning with a classification problem where the model would classify what subtype the patient is, and so my project was the next, you know, the next step essentially in this progression of projects where I utilize this model. So, for about a hundred and fifty patients, class 3patients, I got all their, they qualified if they had already been treated for class 3, but they also needed their pretreatment records so that we could assign their subtitles before they got treatment. So, for the, for each patient, I would take their pretreatment measurements from their SEF. I would input it into the model and then have that patient be assigned a subtype and then I would follow them along and see what treatment they received. Basically, we wanted to see if [00:10:03] any subtype was at a higher risk for jaw surgery, or if they were more likely to be treated orthodontically because essentially the two main treatments for class 3 is jaw surgery once they're done growing or if they're still growing or perhaps they don't want to do surgery and they just only wanted to organize treatment, it's orthodontic treatment. So, the two treatments that we decided on was jaw surgery or orthodontic treatment. So, basically braces for, in other words, and so basically, some of the questions we asked: was the subtype at high risk for surgery and also what subtypes were at higher risk for treatment failure? And lastly, we looked at all three variables where we looked at subtype treatment outcome, which was a success or failure [00:11:03] and the treatment modality, which was surgery or orthodontic treatment. So, we wanted to see, was there a relationship among all three of these variables at the end of the day, and yeah, so that was the design of the project, and we were able to get some interesting results and test this model in a very applicable clinical relevant way.

Interviewer: What do you think are the big implications of the work that you and the rest of the people you're working with are doing?

Pegah Kamrani: My team members, Dr. Fraiser Bowers and Dr. Wiesen, Chris, we, this project has a lot of implications relevant in today's age of orthodontic treatment for class 3 patients. It is still, there's still not a very systematic way of diagnosing class 3 patients based on their unique presentation. [00:12:03] Each class 3 patient is different, and if we can systematically, across all providers, find a way to systematically diagnose these patients and to know what their prognosis would be based on their subtype prognosis being, well are they going to experience success, or are they going to experience failure with this kind of treatment? So, to test a model that has the potential to improve the diagnostic process and in turn better predict treatment outcome, that has a very clinically relevant application and a lot of power in, not only for the provider when they're diagnosing or treatment planning, but also to the patient, you know, it has the potential to save the patient time and money if they know that they are at a very high risk for surgery or if they know that [00:13:03] they're at a very high risk for treatment failure if they don't if they choose to do orthodontic treatment. So, yeah, goes both ways and that's what's very exciting, and this ism I should clarify that this model, you know, it just uses several metric measurements. So, the clinician will almost always be taking a SEF before they start treatment as their treatment planning. So, it's a very accessible chairside tool that they can use and just provides additional patient-specific criteria that they can put in their toolkit as they diagnose their patient.

Interviewer: Are you able to discuss any of your findings from the study so far?

Pegah Kamrani: Yeah. So, I'll highlight a few. We have not published a project yet, but I will highlight a few that I talked about in my presentation. That is that so the subtypes basically were mandibular prognathism. In other words, the patient did [00:14:03] not have a underdeveloped upper jaw rather a lower jaw that, you know, was very prominent compared to their facial features, and the second subtype was a combination of the two where the upper jaw was deficient, and the lower jaw was overdeveloped, and the third was just a lowered underdeveloped upper jaw. So, what we found was that the patients that had an overdeveloped lower jaw only, that they were at a much higher risk for requiring surgical treatment to correct their deformity, and we also found that when these patients that had an overdeveloped lower jaw, when they were treated non-surgically, that is with orthodontic treatment, that they [00:15:03] were more likely to experience treatment failure relative to if they were treated surgically so that if these patients were treated surgically, they were more likely to experience treatment success, but if they were not, they were more likely to experience treatment failure. We found that relationship to be surprising, and when we looked at, you know, stratified analysis of the failed treatment, we did find that up in both surgically and non-surgically treatment groups, that patients that were deficient in their maxilla, which is the upper jaw, that they were more likely--they were less likely to experience treatment failure. So, it basically boils down to patients that were classified with a prominent lower jaw, they often were more likely to have surgery. [00:16:03] And when they were not treated surgically, they were more likely to experience failure. It just goes to show how different it can be when you're treating these patients, how each presentation responds differently to different treatment options, and it goes to show that we cannot uniformly treat these patients without considering what contributes to their presentation and factoring that in as we consider their prognosis and what will be most successful for that patient.

Interviewer: interesting, and I'm sure there will be more and more implications as this research moves forward. I know from talking to you earlier that this is both an academic and personal project for you to some extent. Can you tell us a little bit about what drew you to this subject?

Pegah Kamrani: Yeah. So, what drew me to this project[00:17:03] started with my own personal experience as a class 3 patient. As a young child, I already showed a underbite and my, you know, it has a genetic component. So, my mom actually had to have surgery for it as well. So, she was, you know, very quick to take me to the orthodontist and, you know, try to stop my jaw growth and, you know, get a jump start on that, but unfortunately, and this is an unfortunate reality for many children that receive early orthodontic intervention, is that I did not respond in a way that corrected my deformity, you know, I always had that growth pattern that continued on into my high school, and yeah, just basically into [00:18:03] my high school years, and so even after two rounds of braces and headgear, I still required to have jaw surgery when I first started college, but that the--throughout all of this, I developed a really strong relationship with my orthodontist, and I was fascinated with this deformity, and I took it upon myself to learn about it, to read about it, to watch videos about it, and it didn't come out of a place of fear. I would, I genuinely was curious, and I was not angry about... why me, or why this. I knew that I was going to be okay, and I was in a position where I was supported, and I was fortunate to be in that position where I [00:19:03] could afford to have this surgery, but that experience, you know, prompted this project because this diagnosis is tough for the patient, and it's tough for the provider because you don't--we don't always know how the patient's going to respond, and some patients don't have the time or the money to go through the whole process of orthodontic treatment only to find out later that I still need jaw surgery, and this study has the potential of showing a place in the orthodontic world where we can tell the patient, "You have X percent of experiencing treatment failure with this option or X percent of success with this option, or you're at this X percent of risk for really requiring surgery in the future," and in a way, it helps prepare them, mentally. I personally was, when [00:20:03] I was at an older age, I was personally made aware that, you know, I would require surgery, but not all patients might get that comfort or that awareness, so I think what really moves me is, let's help these patients that are going through this long process, and let's help their diagnostic process as much we can. Let's help their mental readiness for what lies ahead, and let's help them feel confident in the treatment that they're receiving because today, in today's age, you don't actually feel, you might not actually feel that comfortable treating a class 3 patient and knowing, this is totally going to work, or I'm not totally sure, and that's not very comfortable for the patient or the provider. So, yeah, so this study is basically well, let's help them. Let's help them feel confident. Let's [00:21:03] help them. Let's give them another tool in their toolkit of diagnosing and treatment planning these patients. So, yeah, that's a very long-winded way of saying what got me here and why, what drove this project because it wasn't just personal, but definitely played a big role.

Interviewer: Absolutely. Well, thank you for sharing your story with us and everything about your project. I think we can definitely keep an eye out for more work coming from you and from this area. I do, you shouted him out earlier, but Chris Wiesen, Dr. Wiesen, who's been helping you is also an Odum crew member, and I just wanted to ask you about how your experience working with him was.

Pegah Kamrani: Yeah. Yeah, Chris, you know, I couldn't ask for a better team member. Dr. Fraiser Bowers introduced me to him because I've worked on projects in the past. So, you know, it really goes to [00:22:03] show that he has been, you know, a really loyal friend and project team member, so he has always been there when I have a call. I have a question. I have a, can we look at this, can we look at that? So, you know, he, it's been a very long, ongoing project, but he has always made himself available, and he's always been there to provide the answers as to whether, does this have meaning, or are we not actually seeing anything? So, when he, you know, clarified the results after he analyzed all the results to us, it was actually very exciting because it really showed that there were some differences among these subtypes in how they responded to treatment and in what treatment they were most likely to receive. So yeah, I thank him for his time, his efforts, [00:23:03] and as we move forward with publication, I know he will continue to be there and continue to analyze all the weird questions I might have as to what I want to look at.

Interviewer: Yes, he is definitely a go-to guy for that, and if anyone is interested or needs help with similar things out there, we have two full-time staff members, statistical consultants, on staff. Cathy Zimmer and Dr. Wiesen, and they would love to hear from you. Alright. Well, Pegah, thank you so much for joining us and telling us about this awesome project, and we will definitely be keeping an eye out in the future to see where it goes from here.

Pegah Kamrani: Thank you so much Kasha for having me, and I thank everybody on my team, Dr. Fraiser Bowers, Chris, and, you know the support of UNC Adams School of Dentistry because without [00:24:03] all of them, this honor award wouldn't have been possible, and thank you, you know, for giving me the time to talk about it and share my experience.

Interviewer: Absolutely, and you are welcome back anytime, and to our listeners, thanks for joining us. Stay safe and well.