

Dr. Dr. Taiseer Sulaiman - Zirconia Generations: What Clinicians Need to Know

Dr. O'Keefe: On Friday, September the 26th in Toronto at the CARDP meeting, Dr. Taiseer Sulaiman of the University of North Carolina is going to be talking about everything you need to know about Zirconia restorations. To give you a little preview about his presentation style and the type of content he's presenting, I'm asking him a question today that comes up regularly at his presentations: In terms of composition, are all Zirconia restorations the same?

Dr. Sulaiman: Well, John, this is a question that we are often getting right now and so, I'm very happy to have the opportunity to share with the attendees of the CARDP meeting upcoming in September in Toronto. My presentation titled: Zirconia Generations: What clinicians need to know. And what we really admired about Zirconia was its strength. It was strong because it was predominantly tetragonal phase of particles that underwent phase transformation. Basically, what that means is that the tetragonal particles, when crack starts to propagate, they transform into monoclinic particles and they form compressive stresses around these cracks. They prevent them from propagating. And so, the, the first generation of Zirconia that was introduced to us basically had three molecular weight of Yttria. It had 0.2, 5% of Alumina, and it had very high strength. It had low translucency. And so, brands were introduced initially to us like Zirkozahn concerned like a Prettau Zirconia by Zirkozahn, Lava by 3M, Zenostar introduced by Wieland. And so, you know, what really the clinicians had a complaint about was how it appeared and how it looked, and they wanted a Zirconia that was more translucent. And so, this is the example of some of the major brands that was introduced to us at that time. And you can see here that we have the three, molecular rate of Yttria, only 15% of cubic, and that's why it really lacked the translucency. So, researchers and manufacturers looked into the opportunity to enhance the translucency of Zirconia. And hence the second generation was introduced to us. And what they basically did was they lowered the percentage of Alumina in the Zirconia composition. And it still maintained a high strength. It had better translucency. And what I will be focusing on in my presentation is how can the eye perceive the differences in translucency; whether it is worth it to switch to a Zirconia material or a composition based off of the translucency? And what we will be losing because of that?

Dr. Sulaiman: So, brands like BruxZir was introduced, Lava Plus by 3M, Katana (Zirconia) and its high translucency block were introduced as second generation. And here's an example of major brands of Zirconia. Again, we still have the 3Y of the Zirconia of Yttria. 15% of the cubic particles only existed in this second generation. Well, now the demand for an increase in translucency was even, was even increasing more amongst the clinician. And so, what researchers and manufacturers tried to develop was to really push the Zirconia to its limit by increasing the Yttria concentration to five (5) molecular weight percent. And, and also keeping the Alumina at 0.05, they were able to achieve a Zirconia that was more translucent. However, we had to sacrifice the strength. And again, in my presentation, I will point out how much of that strength we really had to sacrifice and how that is reflecting on some of the clinical cases that we're seeing right now. So, it had lower strength, it had enhanced translucency and brands like Prettau, Anterior, BruxZir Anterior, Katana and it's ultra-translucent multilayer block were introduced to us. And here's a list of examples of a major brands that were also introduced at that time. And you can see the five molecular weight of the Zirconia and then here is the 50% cubic Zirconia. So, now if you start thinking the face transformation only happened when we had to tetragonal transforming into monoclinic and now, we have cubic Zirconia in the mix. So, the possibility of face-transformation is decreasing and that's why the strength is going down. And I will explain this further in my presentation.

Dr. Sulaiman: And now, the most recent Zirconia. Unfortunately, these generations are being introduced too fast to us. We have a fourth generation of a Zirconia and basically, they figured out that the lower strength for that Zirconia is really not working for us. And they went now to introduce a generation that has only four molecular weight of Yttria in it. It has better strength compared to the third generation and it has acceptable translucency compared to the first and second generation. And now we have brands like the Katana Super Translucent Block STML and BruxZir Esthetic. And so, I will go into detail of pointing out some of the properties of the mechanical and optical properties of the different generations and what we know from clinical-based evidence related to the multiple generations of Zirconia. I hope to see you all very soon in Toronto. Thank you very much.

Dr. O'Keefe: Taisser, one question comes up for me watching your presentation there. Since all of these generations of Zirconia are still out there, I guess you

have to use different ones in different circumstances. There's significance to that.

Dr. Sulaiman: So, John, that's a great question actually. And, you know, for a clinician to write on their lab form to the technician, please fabricate a Zirconia restoration. I think that is wrong and it's misleading. And what I will be pointing out in my presentation is this specific use for each generation and for each specific case. So, we'll do like a classification for what each generation of that Zirconium material is best for that clinical case.

Dr. O'Keefe: Sounds like a must attend presentation at CARDP in Toronto.

Dr. Sulaiman: Thank you very much, John. I look forward to meeting everyone.