New Findings: The Impact of Acidic Drinks on Tooth Wear and Hypersensitivity
Dr. Saoirse O’Toole

Chiraz: Hello and welcome to CDA Oasis. Erosive tooth wear and hypersensitivity are the focus of much attention in the dental world. There are many factors that contribute to both conditions and research is ongoing to find out more about their aetiologies.

So, to find out more about the topic, I have invited Dr. Saoirse O’Toole, Clinical Lecturer in Prosthodontics at King’s College London. Dr. O’Toole authored a flurry of articles about tooth wear and hypersensitivity and she is here to tell us more about the latest in research on these topics.

Dr. O’Toole, thank you for joining me today and welcome to this Oasis Conversation.

Dr. O’Toole: Great. Thanks for having me.

Chiraz: The common thread between the articles that I reviewed is the impact of acidic drinks on tooth wear and the subsequent hypersensitivity. Can you please tell our audience what your research projects have been about and why are they important for dentistry?

Dr. O’Toole: I suppose we're all seeing an increase in the prevalence of tooth wear there's been several reviews that have shown that the prevalence is increasing globally. And part of my research has been showing the impact that diet has on this and what are the underlying risk factors because actually if you look at the literature, there are some studies that show no link between erosive tooth wear and diet, whereas we know that that's the case. So, what we find out in these studies was the frequency at which would cause erosive tooth wear; so the frequency of dietary acid intake. And what we found was that it was what you did on a daily basis that mattered, so anything less than daily didn't really count towards erosive tooth wear and wasn't significantly related. And that's maybe why those researchers who didn't find an association, they tended to investigate what the patient did on a weekly basis.

Dr. O’Toole: And then what we found out was that every single additional intake really increased your risk. So, the risk of the odds ratio or the risk of developing erosive tooth wear if you had two daily intakes was in and around 4. Whereas if you had three or greater daily acid intakes, that jumped right up to around 13 or 14. So, you were 13 or 14 times more likely to have erosive tooth wear with three or greater acid challenges a day. Now, whenever we broke that down further into acidic drinks and fruit, there were different odds ratios, again. So, fruit intake with meals showed no increased risk of tooth wear, fruit intake outside of meals did, and again increased with the number and frequency
between meals, but then acidic drinks were significantly associated with tooth wear, whether you have them with meals or between meals, but between meals was a big risk factor for a UK-based study. Using a big population data set from America, we found out that acidic drinks with meals constitute the risk factor. But again, they're two different studies and the Dataset from America was only from 2003. So, it's a bit older.

Chiraz: So, you've established the daily consumption is more important in showing the connection than a weekly consumption. Is that correct?

Dr. O'Toole: Exactly. So, it's what you're asking patients is what they're doing on a day-to-day basis.

Chiraz: You also authored an article about whether a behaviour change technique was more effective than standard-of-care diet advice at reducing dietary acid intake, can you tell us more about that please?

Dr. O'Toole: Yeah. So, there's pretty good evidence to suggest that just giving people dietary advice or just saying, cut down on the amount of juices or fizzy drinks you have is ineffective at changing their behavior. So, working alongside dental psychologist, we developed something called an If-Then Plan, which is a behavior change technique, which involves planning how you're going to make the change. We did a randomized controlled trial and to half the group we gave dietary advice, to the other half we gave this If-Then Plan. And we followed their tooth wear and measured it over six months measuring it with laser profilometry and then super-imposition software. And we found that both groups said that they reduced their dietary acid intake, but only those who had the behavior change intervention actually had a reduced amount of tooth wear over that six-month period. So, we think that the behavior change intervention is more effective at actually reducing behavior change.

Chiraz: Can you tell our audience about the findings of the research on Dentin hypersensitivity?

Dr. O'Toole: So, we know that dietary acids can cause dentine hypersensitivity. And then again using the same data set, we managed to show that things like the amount of time that you spend consuming fruit or whether you sip the drink slowly swished it around your mouth and held it in your mouth was actually a bigger predictor of dentine hypersensitivity than it was of tooth wear. So, that's why maybe those with dentine hypersensitivity might not always have tooth wear and people with tooth wear may not have dentine hypersensitivity.

Chiraz: These are very interesting findings. What are the implications of these findings on clinical practice? The type of advice that is given in clinical practice and the type of oral health education that takes place in the clinical practice.
Dr. O'Toole: Yeah. So, what I tell my patients when I'm now giving dietary advice, I'll say: "if you can, have it less than daily and then if you are going to have it, try and have meals." And when I'm giving that information, I'll try and incorporate some type of planning. So, what I would say: "whenever you go for your juice in the morning, what would you have instead?" And they'll then normally something like: "oh, I'll just have water." which isn't really a good substitution. So, I'll say: "oh, is that going to be a nice enough drink for you? Is there anything else that you'd prefer?" Or if they're going to have a cola drink; are they looking for the fizziness or the caffeine; and then I would ask them what would help them make that change. It's actually getting the patient to think about the steps that they would take to make the change is a lot more effective.

Dr. O'Toole: The other implication is that what we found was that there were really big jumps between each additional acid intake. So, cutting down even from 2 a day to 1 a day would hugely decrease your risk and cutting down from 3 or 4 a day down to 2 a day is really significant. So, every single dietary acid that you can cut down really helps.

Chiraz: So, recently around the world there has been this trend of imposing or thinking of imposing taxes on acidic drinks, such as soda for example. Do you think that your research could have such policy implications or could contribute to such policy strategies?

Dr. O'Toole: So, we all know that policy changes are probably the most important changes that we can make from a health point of view as in smoking. Smoking really dropped whenever we said that you couldn't smoke in places of work or restaurants. So, yes, any type of policy change will have huge effects. I'm not sure if that's going to happen or whether that should happen, but it probably will have an effect on tooth wear.

Chiraz: But do you think that your research has such implications on policy directions?

Dr. O'Toole: I'm not sure because tooth is different than carries in that tooth wear is manageable. To me, tooth wear is more like a signal diagnostic where something is going wrong here. Diet has been out of whack, you've got gastroesophageal reflux disease, maybe an eating disorder. And it is also entirely preventable by cutting down on these measures. Whether or not it should happen. I'm not sure. I think we could maybe try concentrating on other dental diseases that maybe are a bit more destructive first of all.

Chiraz: Perfect. Thank you so much for taking the time to speak with me today. I really appreciate your time and I hope to host you again on Oasis.

Dr. O'Toole: My pleasure.