

**Dr. Bob Wood - A Systematic Approach to Using Radiology in the Dental Practice: Episode 1**

Dr. O'Keefe: Dr. Bob Wood, who's a radiology specialist and he's the chief of dentistry at Princess Margaret Hospital in Toronto and together we're going to record a series of conversations about the systematic approach to using radiology in your dental practice. Bob, what are we going to do over the course of this series?

Dr. Wood: Well, I think this is going to be a lengthy series and I think we're going to cover everything from, you know, radiation safety and perceived risks all the way up to ultimately how can you get more out of the radiology part of your practice. How can you get more information, how can you help your patients better and how can you integrate radiology into your clinical and other parts of your examination to the benefit of your patients?

Dr. O'Keefe: And why are we going to shoot the series?

Dr. Wood: I think the main reason we're gonna shoot this series, is people sort of just look at images and I'm not really talking about bite wings per se, but other images, panoramic images and so forth and even advanced imaging and they have no idea of how to just sort of slow themselves down, examine the films, make their observations and then try to discern what's visible on their imaging set rather than just wait for something to pop out, that catches their eye.

Dr. O'Keefe: I guess over the course of the series we're going to have some theory, but a lot of practical advice.

Dr. Wood: Absolutely. We're going to start with, I hate to say it, but some of the duller things that one has to think of with respect to radiology. And then we're going to move reasonably rapidly into a situation where your viewers are going to be presented with images that we're going to ask them to interpret. And then we're going to go over those images and then we're going to go even further into advanced imaging. And even, as we have in the hospital here, you know, MRI CT and things like that. Not expecting them to become facile at them, but just to show that the same principles of the systematic approach to radiologic interpretation holds true no matter what image you're looking at, it's the same process. Rather than having them think that, oh my gosh, I can't possibly interpret a cone beam CT because I don't know anything about cone beam CT or I can't possibly interpret some very advanced imaging. The principles are the same.

Dr. O'Keefe: I think you're going to bring in some of your colleagues?

- Dr. Wood: Yes. My principal colleague I am going to bring in is Dr. Jeff Chadwick, who is a specialist radiologist and a PhD candidate and works with me here at Princess Margaret.
- Dr. O'Keefe: And will we get to do some interactive...
- Dr. Wood: We're going to show films and we're going to provide films when we may leave. We'll leave off for the film today and maybe two films today and let the viewers try to use their systematic approach or their method to see if they can figure out (if that's the right word) or if they can divine what the quote unquote answer is and then see how they do. And then we'll take them through the approach and how we look at images systematically.
- Dr. O'Keefe: And before we get into, as you call it, the duller stuff, and that's the whole thing about the risk real and perceived, do you want to show us a film or two? And then we could set the next episode for getting into the risk reduction.
- Dr. Wood: Sure, I can, I can pop up an image if you like. And we can look at an image. I have them all on my, on my screen here.
- Dr. O'Keefe: So, Bob, you've projected this image here. Just walk us through it in the style that you'll walk us through radiographic interpretation over the course of this series.
- Dr. Wood: Sure. So this is this is a panoramic image of a patient in our practice and it shows some obvious findings and I think that the viewers can see at least two obvious findings in the body, the right mandible, you know in the second molar and in the first premolar area. And your eye is immediately drawn to these areas. And, psychologically you want to immediately figure out what these are. It's just the way we are, you know, it's the Bushman in us. We see something we see are prey; and we want to figure out what that is and what we're going to do about it. But there's so much more on this image and so much more important things on this image than these two particular radiolucencies. And even these radiolucencies here have their own story.
- Dr. Wood: So, if we just we're just sitting and looking at this film, I'd say, well, there's the problem. The problem is clearly in the right mandible, we're going to miss a lot of the information that's critical information on this film and information that impacts on the patient's care. This patient is going for a treatment that involves fairly heavy chemotherapy and a peripheral stem cell transplant; they're going to get their own stem cells back. We don't want to make a mistake on this patient. We don't wanna make a mistake on any patient, but if we just get stuck here and we get what's called search satisfaction, I'm satisfied I found the thing that's wrong, we have not found the things that are wrong because we know

this patient is going to become myelosuppressed. They're not going to have an immune system; the platelets are going to be reduced.

Dr. Wood: We won't be able to do anything on him and we know, we will know shortly that they have other findings which are more important than these. So, I always start at the right condyle and, interestingly enough, we referred to Dr Chadwick and he doesn't start at the right condyle. So, I look at the right condyle and first thing I do is I trace around the borders of the mandible, the inferior border all the way along and I see them, but I'm not going to pay attention to them. I see those two big gray areas and we get up and I trace around the other condyle, the coronoid process. I trace around, check the height of the periodontal bone, and I go up, check the other coronoid and up to where I started. So now I've traced the entire outline of the mandible.

Dr. Wood: I count the teeth something I learned in my first board exam when I didn't count the teeth and it was wrong and it was a very embarrassing mistake. So, we count the teeth, make sure there's the normal complement of teeth, or in this case the patient is partially edentulous. Then, we go to the maxilla and we look at the same things in the maxilla. We look at the bony borders in the maxilla. So, we're going to trace the maxilla as we can see it along the periodontal bone. We look for three lines. They're not always present, but you should look for them. One is the posterior wall of the sinus, one is the infratemporal surface of the zygomatic bone, and the other one is the posterior wall of the maxilla itself.

Dr. Wood: We also look for the pterygoid plates and now we've done our borders. We're going to look at the inferior border of the sinus.

Dr. O'Keefe: They all look to be present, they look to be integral. There's no abnormalities. That seems to me...

Dr. Wood: Well, I hate to say this, but there are actually some problems with these borders. When we get up into the maxilla, this area in the right maxilla where the premolar or molar has been extracted, there is a very unusual looking radiolucency there with a radiolucency inside that may or may not be a sinus; that may be a residual cyst, which I'm jumping way past the systematic approach, but I'm just saying this may be a pathologic entity. If we go over to another part of the image, we can see there's a soft tissue area in the left posterior maxillary sinus as well, so we do have things here that aren't normal. So, all we want to do now is just we're going to do this systematic approach and we just traced the borders. We haven't even looked at the interior structure yet. When we count the teeth and the upper jaw and yes, we have teeth in the upper jaw, some missing, some not missing, so we've looked at the borders of the physical structures and we've counted teeth. The next step is for us to look at the internal structure and this process that we're talking about today; it takes

a very long time when you explain it the first time, so I'm going to not get into everything.

Dr. O'Keefe: Just a little preview here.

Dr. Wood: Yeah. I'm going to get into some things and we're going to get into the germane thing about this image that germane things about this image for this patient. If we start to look at the internal structure of the mandible, by which I mean the bony structure between the borders that we looked at, we can see there's these multiple areas of radiolucency that you can now appreciate if you're paying attention; and there are several of them here, they occur both below the neurovascular bundle, like here and here and here, and they occur above the neurovascular bundle or superior to the neurovascular bundle and they're also on both sides.

Dr. O'Keefe: Yes, I've noticed one over there on the left too.

Dr. Wood: There's another one here, there's some here. And, there may be some, even in the styloid process over here, there's actually some punctate punched out radiolucencies. Believe it or not, these are the critical findings on his image. Does this patient have multiple Myeloma? So, these are lesions of multiple Myeloma. Now I have jumped about 30 steps just to give your viewers a taste of what goes on, but what's important in this soon-to-be immunocompromised patient. Yes, they have myeloma. Well, I got that from the medical history because I asked them, so I know that perhaps, and it has happened that Myeloma has been spotted as an incidental finding on an image. It would be unlikely, but it's possible. But equally important is if this is a system, if this is infected or if these are residual cysts and they're infected, then they have to be dealt with prior to the patient's stem cell transplant. So, you can't just stop at, you know, the most obvious thing and say, well this is what's wrong, you have to, I hate to use the word extract, but you have to extract as much information from your film as you can and what we've just done, it doesn't even touch 10% of what should be done with an image.

Dr. O'Keefe: Bob, thank you very much for walking us through your approach with that image. I take two things from that exercise. The first one is don't fall into the trap of seeing something and thinking that's the most important thing on the radiograph; I'm not looking at anything else.

Dr. Wood: Correct,

Dr. O'Keefe: And number two for every radiograph. I've got to go through the same systematic approach and work my way through a radiograph so that I can actually find what might be on that radiograph.

- Dr. Wood: Right. You wanted to find all and everything that's on that radiograph not just the thing that might be most obvious to you because the most obvious thing to you as we've seen in the last case, wasn't the most important thing.
- Dr. O'Keefe: Well, I certainly look forward to the further episodes of this series where we go through the same approach with all sorts of different radiographs, but in our next episode we've got to do some science. Is that right? Just give us a little preview about what we're going to be doing the next time about risk.
- Dr. Wood: Sure. I just want to just say one thing though is that when I'm going through the systematic approach, this is something that myself and Dr. Chadwick and the other radiologists across the country, they do it very, very quickly and they don't slow themselves down because we've learned this. So, for us it is an automatic way of doing things, but for your viewers, it's going to seem at times we're really beating these radiographs to death. But ultimately, you know, first you get good, then you get fast. So, we're going to start out and we're gonna make sure we slow down and look at everything. That's very important. I don't want everyone to think that, oh my gosh, every time you look at the radiographs can take me 45 minutes to figure out what's the most important thing or what all the important things are because it won't. But when you were first learning, when the novice is learning, you want to make sure that you have the approach, the technique first, and then you can apply that technique.
- Dr. O'Keefe: You've used the word novice we're all sort of learning. But even very experienced practitioners could miss big stuff.
- Dr. Wood: Absolutely. See it all the time. Yeah. You get tunnel vision and you forget the one thing that I, in my few communications with the great Dr. H M Worth said to me, look at the corners of the film, meaning, make sure you look at all the film.
- Dr. O'Keefe: That's advice worth taking.
- Dr. Wood: Absolutely.
- Dr. O'Keefe: I look forward to coming back the next day to talk about risk.