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*Highlights Newspaper Publication*  
Interview with Dr. John Schondelmayer with Linda Meeuwenberg, RDH

**3D Dentistry**  
Sinus Pathology And Its Relation To Implant Surgery

**More sinus pathology referrals are needed from medical radiologists to dentists:**

Currently, when we find a hopeless upper tooth and plan to replace it with an implant, we first obtain 3D radiographic imaging. The reason is that using pre-surgery three-dimensional imaging we quite often discover incidental pathological lesions in the maxillary sinus. I recently attended a medical radiology training conference designed to prepare medical radiologists for their board exams. At the conference, there was a section where the radiologists were studying sinus floor lesions. It was an extremely short section because the speaker said to his audience, “*Anything on the sinus floor is odontogenic.*” (derived or originating from teeth). That was the end of it! Based on their training, if the medical radiologists observe something on the sinus floor they often ignore it. Yet sinus floor pathology is a common finding that should be referred to the dentist for evaluation. The danger is that infected teeth that produce sinus floor pathology can be the source of bacteria that travel through the blood stream and tissue spaces to infect other areas of the body including the heart, brain and joints (bacterial arthritis), among others.

**3D scans before tooth removal for upper implants save dental patients pain, time and money:**

What we started observing in 3D scans was an abundance of sinus floor pathology. Virtually without exception, you could clearly see that the sinus floor pathologies were coming from teeth and in some cases, the bony sinus floor had a hole in it over the infected tooth of 5, 6, or 7 millimeters, sometimes more. Seeing this we realized that when we extracted a tooth under an existing sinus floor hole, we could at the same time easily build up enough bone into the sinus for an implant. This eliminated the need for an additional and usually quite invasive bone graft surgery later! Before placing the standard socket bone graft, we scrape out any weak, infected soft tissue with a surgical spoon. Then we rinse the socket with a highly concentrated solution of antibiotic fluid to kill bacteria. (Dirty Socket Protocol) Sometimes we will insert a barrier membrane at the apex of the tooth socket if the Schneiderian Membrane is weak or has a hole in it. Then we pack in a ball of bone and PRGF big enough to hold an implant later on when healing is complete. The PRGF (Plasma Rich in Growth Factors) is created from a small sample of your own blood plasma and activated to form a sort of tougher than Jell-O substance that holds the bone graft particles in a ball or any other shape you need long enough for human bone to replace it. With the bone ball is in place, we cover it with another barrier membrane and suture it in place. There is actually minimal pain and swelling from this procedure--amazingly, there is usually less pain and swelling than after an extraction done without bone grafting. When it’s possible to perform a sinus lift through an extraction socket you’ve saved that patient the inconvenience of another more invasive sinus bone graft procedure later. At this juncture, we are placing bone grafts at the time of an a traumatic extraction for $400 or $500, even when performing a sinus bone graft at the same time. Sinus grafts that are placed from the cheek side of the sinus above the tooth roots are running between $3,000 and $4,000. (Tatum Sinus Lift Procedure) So this has changed the entire way of thinking and practicing dentistry. CBCT imaging makes the sinus lift bone grafting at the time of extraction safe, possible and a lot less expensive.

**3D Scans And Surgical Guides Are Necessary For Accurate Implant Placement:**

We take 3D CBCT scans for other doctors in our area. What we’ve found is that almost all of the time, we are able to determine if the doctor has used a surgical guide to place implants. We have images of implants that were unintentionally pushed into the maxillary sinus. We have a case for example, where an oral surgeon placed implants in both sides of the mandible to replace the second bicuspids. Unfortunately, the implants were inserted into the mandibular nerve canal on both sides of the jaw, permanently anesthetizing the patient’s lower jaw, lip and chin. Totally preventable with 3D CBCT imaging and treatment planning! And almost no chance of occurring with the use of surgical guides! In another patient, implants were placed that penetrated through the lingual plate of the mandible, obviously very close or coming dangerously close to the lingual artery. This can cause a major bleeding and there are documented cases where patients died after the lingual artery was damaged during dental surgery. In yet another case, a specialist quite proud of his technique explained to me how he did it without 3D scanning. He said he used the old two dimensional x-rays during the implant surgery to aid him in determining final positioning of the implants. We subsequently saw this patient to scan for future implants. Sadly, none of his implants were parallel with each other and they were placed at several different angulations! They were also not properly spaced for future tooth crowns. I’m sure they looked parallel and properly spaced to the specialist during surgery, but they were not! Improper placement of implants can make implants useless and sometimes impossible to restore. One hundred percent of these problems can be prevented with the use of 3D scanning and computer generated surgical guides.

**Nobody Can Consistently Place Implants In The Most Ideal Positions Without 3D Scanning And Computer Generated Surgical Guides:**

In one case, we had a specialist who surgically placed dental implants in a general dentist's jaw. Again, the implants weren’t really usable. They were all in the wrong places! What was the dentist supposed to do? Major surgery to take them out and move them to the correct positions?! It doesn’t matter if it is a dental specialist or general dentist one cannot place implants where they belong without 3D imaging, except in rare cases. For example, you can get an implant pretty close if there’s a tooth on each side of the implant site and you cut a large flap so you can see a wide area of the jaw bone. A 'flap' means folding back the gum tissue from the jaw bone like you peel an orange. Personally I would a lot rather have my surgeon use a computer generated surgical guide and leave my gum tissue attached to my jaw where it belongs. There are many doctors who place implants without a flap, but doing that without a computer generated surgical guide means it's going to be even more of a guessing game getting the implants in the right positions and at the right angles. Implant drills tend to walk a little at the start and the surgical guide stops the first drill from walking out of position or from drifting off angle or off target when it encounters internal bone of differing hardness inside the jaw. Despite the number of off angle implants, there has been a lot of success and I think the credit goes to the engineers that made the implants because they’ve made implants so they tend to last even if the implant crown cannot be made to look as good as it would with better implant placement. If the doctor uses 3D imaging and computer generated surgical guides to perform implant surgery it adds safety and eliminates these unfortunate complications.

**The "Usual" Dental X-Rays Are Now Thought Of As Preliminary Scout Films To Determine Whether 3D CT Scanning Is Needed**:

Most patients we see will complete health history forms. And we've added a few questions regarding the patient's sinus status to our health history form. We ask the patient about current and past sinus symptoms. So we’ll say, ‘Do you have any sinus drainage or sinus blockage that is chronic in nature?’ The patient will respond, yes or no. We’ll also ask if they respond yes, ‘Is it on one side only or does the symptom always start on one side?’ If it’s affirmative then you have a good chance the patient has sinus pathology and it could be related to the teeth. We then take a panoramic radiograph to determine whether to request a 3D CT scan. If we have missing teeth and want to know whether enough bone is there for implants anyway, we skip the panoramic radiograph and go directly to 3D scanning. Even if the patient claims they have sinus congestion on both the left and right that never seems to go away, especially unless they are on antibiotics, we will take a panoramic radiograph and/or 3D CT scan. In those cases, they could have infected teeth on both sides of the jaw that are causing the problems. A careful analysis of the CBCT scan is useful for learning whether the teeth are involved in sinus pathology. Presence of sinus pathology that is not related to the patient's teeth, warrants a referral to the ENT physician.

**Chronic Sinus Problems That Persist After Visiting The ENT Physician Are Often Tooth Infections:**

We have had cases where patients visited an ENT, had sinus surgery and the problem kept coming back. For some of these chronic sinus disease patients we determined that the teeth were the cause of the disease. In one case, the sinus floor was absent and we performed a sinus lift or sinus augmentation procedure through the extraction socket. This was done at the time of the extraction and we later placed one implant. In this case we saved that patient about $3,600 by eliminating the cheek hole sinus lift later! It also saved them the risks of general anesthesia during complex sinus lift surgery and future visits to the ENT physician. Sometimes it is possible to change a patient’s quality of life by eliminating a future sinus surgery with a dental procedure.

**Orthodontics Patients Benefit From 3D Scanner Imaging:**

For orthodontic patients who need regions of teeth moved, single teeth immobilized, or headgear worn strapped to the head outside the mouth, we plan on using TAD's (temporary anchorage devices). TAD's are very small titanium implants that were originally developed as uncoated smooth titanium screws used in block bone grafting procedures. The temporary implant only goes through the top surface of the bone where the bone is quite dense. TAD's are used as an anchor point and as leverage to move teeth without creating other undesirable tooth movements. The 3D scan allows the dentist or specialist to locate exactly where the TAD's can be placed safely between tooth roots. TAD's are great for eliminating the use of orthodontic headgear. The orthodontic patient is not required to wear an unsightly apparatus outside of their mouth especially in front of their peers.

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