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Clinical Applications of Emerging Tactile-Sensing Technologies

ReachMD would like to wish you a happy and healthy New Year and with each New Year comes a fresh start. As we look ahead, ReachMD is proud to present this month's special series - Focus on Future Medicine.

Clinical breast exams and emerging technologies. Can manual exams be improved? You are listening to ReachMD, The Channel for Medical Professionals. Welcome to Focus on Future Medicine. I am Dr. Gary Kohn, your host and with me today is Dr. Cary Kaufman. Dr. Kaufman is a breast surgeon and assistant clinical professor at the University of Washington. He has lectured and published extensively on the diagnosis and treatment of breast cancer. He is the past president of the National Consortium of Breast Cancer Centers and recently led NIH-funded research on tactile-sensing technology. Dr. Kaufman comes to us today from Los Angeles and today we are discussing clinical applications of emerging tactile-sensing technology.

DR. GARY KOHN:

Dr. Kaufman, welcome to ReachMD. Thanks for being with us.

DR. CARY KAUFMAN:

Great to be here.

DR. GARY KOHN:

Before we talk about some of the technical issues in sensing technology, may be you could give us an idea of your medical background and how you got interested in this part of the breast cancer business.

DR. CARY KAUFMAN:

All right. Well, I am a breast surgeon. I started out as a general surgeon in the last 12 years or so. I am just solely involved with breast diagnosis and breast cancer treatment. I think the way I have got to this is because I actually started in Los Angeles, Long Beach and then I was involved with Dr. Laszlo Tabar **(01:30)**, who is the internationally known mammographer, who really proved that mammography saves lives and I was the main surgeon when he was doing his lecturing across the country and just had been involved with breast cancer like I said diagnosis and treatment and moved from Los Angeles to Washington State about 13 years ago and I have

continued that progress and been involved with this particular project for the last 5 or 6 years.

DR. GARY KOHN:

Well, most of us I guess, who are practicing, think about the clinical breast exam as digital palpation and mammography may be ultrasound, may be biopsy or MRI. We are talking about something new and different here. As a breast surgeon, how this does fit in your way of looking at suspicious clinical findings?

DR. CARY KAUFMAN:

Well, we have had tremendous progress and all those items that you have said we have had, mammography has improved. We are now using digital mammograms. Ultrasound transducers have gotten smaller and more portable. MRI has gotten computer-assisted diagnosis. We have scintimammograms and a variety of PET scans and pen scans. We have a lot of technologies, but none of the technologies have improved than clinical breast exam and certainly the clinical breast exam is the most accessible exam open to every women with no pain, with easy access and really unfortunately it is used too often and there is no clear criteria of what the clinical breast exam is. I mean we have been looking different textbooks. It is described in a variety of ways and often too inadequately described or there is very little **(03:00)** attention described in describing the clinical breast exam and anyhow this is the first huge step of progress in the clinical breast exam when you translate the clinical breast exam to an image and now you have a documented image that accurately describes the clinical breast exam.

DR. GARY KOHN:

Right. Well, although we are on radio, I am going to ask you to describe may be what that image might look like or what the physician or provider actually sees when he or she does this?

DR. CARY KAUFMAN:

If I examine a patient and I feel let's say a smooth round cyst, let's say or fibroadenoma, round nodule, I might describe it in my exam as, you know, this is a smooth nodule, it measures about so big and it is movable and has a certain hardness to it or firmness to it and it seems to be homogeneous. There are specific components of the physical exam. Well, if I wanted to look at what that nodule would look like under the pre-mammogram exam, under this palpation imaging exam, it would like a single hill like a smooth peak if you will where this hill like the single hill out in the middle of nowhere would have a height and the height would be related to how hard the lump is. If the lump was soft, the peak wouldn't be very high, but if it was hard, it would be much higher relative to the surrounding area, like the valley around it and the valley would be the normal breast tissue around the palpable lump and then the width of the hill, the base of it, if you look at the base of the hill, it would have a width and a length, that would be the size of a lump that you are feeling **(04:30)** and then if it was a smooth, round lump, then the hill would have a nice symmetric peak. It would go up and down like a bell-shaped curve, let's say. On the other hand, if it was a cancer, which is very non-homogenous, meaning it is lumpy or irregular and jagged, then the peak would be multiple peaks and some would be of different heights and then that would be a malignant lesion.

DR. GARY KOHN:

And so this picture that you are describing that's something obviously that can be saved, can be printed; can be put in the chart.

DR. CARY KAUFMAN:

Yes, exactly. It's real time. So, you place this transducer over the lump and you have an immediate picture on the device where you are looking at a picture that I just described. The other thing about the picture is it's in color and the higher the pressure, like the top of the peak, the top half will be of the colors of the rainbow, it will be red and as you go from the high pressure down to the low pressure, it goes from red to yellow to green to blue and the very bottom the low pressure, the low valley around the peak, would be blue. So, you have both the physical shape and the color change and you will see that immediately on your machine and you know a click of a button and you have the report.

DR. GARY KOHN:

If you are just joining us, you are listening to a Focus on Future Medicine. I am Dr. Gary Kohn and I am speaking with Dr. Cary Kaufman and we are discussing clinical applications of emerging tactile-sensing technology.

Cary, you described a picture for us. How do clinicians respond when they see this for the first time and they are thinking about applications in their own office, in their own practice, what kind of feedback have you gotten?

DR. CARY KAUFMAN:

(06:00) Well, the feedback is very prompt. When people see this, they say "Oh, I get it." I mean it doesn't take very long to figure out what it's doing and how well it does and the person immediately wants to grab the probe and examine something. So, I think as far as translating the clinical breast exam to a digital image they see that and then they see the uniqueness of it. The fact that there is nothing like it and then the other thing is how does it fit in and it can fit in a variety of areas. From myself, I am a breast surgeon, it aids in my documentation of a clinical breast exam. If I tell you that I feel an area that is thickened or fibrous or dense or glandular or firm, what does that convey to you. On the other hand, if I give you a picture that has an exact visual of what the physical exam is, then you can see it right away and the other thing is if I examine the same person next week or you examine the same person next week, you will get the exact same picture and we don't have to be caught in using the word fibrous. That's what I am saying as a breast surgeon. On the other hand, there is a tremendous potential benefit here for screening. I just came back from China where the doctors there were very impressed with this and think that this will be useful as in screening women. China and other developing countries have a big issue that most of their patients there have palpable lesions and mammography is not as well developed in countries such as that and the doctors there were very impressed. In fact, they have a million women's program where they want to examine a million women. I think they have done 120,000 already and they are seriously considering using this as well as their other screening devices **(07:30)** to see if this will improve the early diagnosis of breast cancer in their population.

DR. GARY KOHN:

Cary, can practicing MDs in this country access this technology right now?

DR. CARY KAUFMAN:

There is a website called www.premammogram.com and that I think is just going through an upgrade, but I think it's just like it sounds, www.premammogram.com and they can get information about this, the devices present and it's just a matter of figuring of what's the best way to utilize it in your particular situation, are you screening patients, are you a breast surgeon, are you a family practice doc who wants to give a better exam to patients. I just had a patient who came in with a fibroadenoma; a smooth, round lesion to have a clinical

idea of it, but I use this device and not just because I am used to it, but it only took me about 2 minutes to do the exam and with the click of a button, I had a colored printed report showing the lesion as I described it, that hill, the report pops out, describing the exact size of the lesion, how hard it is. It gives you a visual and you can hand it to the patient or you can put it in your chart or you can add it to your consultation note and include it in your e-mail as you send a consultation note in e-mail and it's just very fast all this. I also do ultrasound, but when I do an ultrasound, I have to type up a report. This kind of is a 1-touch shopping here.

DR. GARY KOHN:

Is it also economically feasible for small practices? Is there a CPT code for it? Is it going to be paid for by insurance?

DR. CARY KAUFMAN:

At the moment, there is not a specific CPT code for this. I think it augments here your practice. Actually, I did a study that was published in the American Journal of Surgery **(09:00)** and part of the study, we asked primary care docs, how would you respond if you got 3 types of consultations from surgeons about the physical exam, one of whom had this report, one of whom didn't, and one of whom was a handwritten one and one was a typewritten and the bottom line is when the referring doctor saw this report along with the whether it be a handwritten note or a typewritten note, they thought that the doctor that sent this report was much more skilled and had a better fund of knowledge of even how to do breast surgery, but at least it was a better fund of knowledge and it was more current with current examination, they thought it was a more thorough exam. I found it just a matter of conceptualizing it. It is a more thorough exam because it documents it more accurately than my verbal description or handwritten description on the chart.

DR. GARY KOHN:

You see this as a pre-mammogram setting and then going on to the mammogram or do you see it instead of in addition to?

DR. CARY KAUFMAN:

The world connects it with mammography, but it is really connected to the clinical breast exam. It is the more accurate clinical breast exam. So, wherever you are going to do a clinical breast exam, this defines a clinical breast exam. It defines it for that day, if you have to be out of town and your partner is going to examine that patient and they are going to read your notes, if it's a finder for that person because then they can do the exact same exam on that patient and know whether the lump is getting bigger or smaller.

DR. GARY KOHN:

I am thinking as you are talking that this might have some value in education as well, like with medical students or residents in terms of consistency of here is what you feel, here is what it looks like **(10:30)**, here's what it means to somebody else as well, any thoughts of using it in that fashion?

DR. CARY KAUFMAN:

Exactly, I think it extends the reach of instructors. When you have a medical student, you are the teacher and you examine the patient say here feel this, okay now look at the palpation imaging picture, that's what either a cancer feels like or this is what a fibroadenoma

feels like. Then, the student can go out to their own clinic and examine the patient and do this palpation imaging and get a visual of whether they are examining or describing their lesion correctly and it really extends the reach of the professors.

DR. GARY KOHN:

What's in the future for you, Cary, doing some more research, you taking this out to a wider audience?

DR. CARY KAUFMAN:

This is really the first step just to document the clinical breast exam, which is you know FDA-approved procedure, but what's happening in the research is really this device will eventually help make the diagnosis of what the lesion is or whether it's benign or malignant and I actually published the study in the American Journal of Surgery where it accurately identified whether a mass was present or not, but also was able to identify whether it was malignant or not and I actually did a little bit better than the clinical breast exam and that was really with basic technology. I think the new technology; the new algorithms that are in the pipeline are going to be able to give you a fairly accurate statement as to what the lesion is and what the next step is.

DR. GARY KOHN:

Any thoughts about its applications outside of breast exams, is there any reason it can be used for like prostate palpations or things like that?

DR. CARY KAUFMAN:

When **(12:00)**I was in China, the doctors asked me can you use this on thyroid because palpation of thyroid is somewhat difficult for a variety of us and I think it can be with some modifications of the transducer, I mean the flat surface of the neck is different than the flat surface of the breast, but for example that might be another application because I am just specializing in breast and I haven't thought about treatment beyond those applications.

DR. GARY KOHN:

My thanks to Dr. Cary Kaufman, who has been our guest. We have been discussing clinical applications of tactile-sensing technology.

I am Dr. Gary Kohn. You have been listening to a Focus on Future Medicine on ReachMD, The Channel for Medical Professionals. We welcome your comments and questions at www.reachmd.com, which now features on-demand pod casts of our entire library. Thanks for listening.

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