The 1st Asian American Health Conference
Concurrent Sessions 1

Oral Health

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One of the interesting aspects of this morning was that towards the end of the session we began to hear comments about something we hadn't heard during the earlier talks - that there is a relationship between things that go on in the mouth and the rest of the body, and that oral diseases can, in fact, have profound effects on some systemic conditions. One of the things I'd like to do today is expand on that theme and demonstrate why, in fact, this is the case, what we know today, and what some of the current research is. In my former life, I was Chairman of Dentistry at a community hospital and when I talked to physicians I always started out by noting that physicians often look upon the mouth as the "Holland Tunnel of the body". They use it to get somewhere else but they don't think it's very exciting getting there. Over the years I've tried to dispel this notion and demonstrate that, in fact, the head is connected to the rest of the body and therefore what occurs in the mouth can have some systemic influence. During this session on oral health, I will start off by talking about the relationship between periodontal disease and systemic health, then we're going to hear about oral cancer in South Asian communities, and lastly, we'll learn of some of the public health considerations and concerns.

I'll start by presenting a brief overview of periodontal disease. What is the disease process we're talking about, why is it important, both locally and systemically, and what are its cause, pathogenesis and preventive measures? Then I'll present the small bit of data that we know about the prevalence of periodontal disease in South Asian populations. And I should note that, consistent with the theme we've been hearing all along today, there are, in fact, not a lot of data, particularly for South Asian communities within the United States. And finally, I'll say a few words about mechanisms by which periodontal disease may serve as a risk factor for systemic diseases.

Now since I essentially was asked to give what could constitute a two hour lecture in 15 or 20 minutes, I want to start with the "take away" messages, so if I don't have a

chance to fully expand on everything at least you'll know the key points I'd want to make. The first is that when we talk about periodontal diseases we're talking about infectious diseases that can result in loss of bone supporting the teeth, and ultimately can lead to tooth loss. The second is that periodontitis can have significant local and systemic effects. So, from a local perspective, you have a disease that starts out with inflammation of the gum tissue and then begins to progress, if untreated, slowly down the root surface so that you begin to lose both soft tissue and supporting bone. This can lead to gingival (gum tissue) bleeding and with more advanced disease there can be acute exacerbations in the form of periodontal abscesses. Teeth can become loose and can ultimately be lost if nothing is done to stem this process. And ultimately if one loses teeth, has spaces develop between the teeth, or has oral malodor as a result of bacterial accumulations, this can have a very profound negative impact on the quality of life of the affected individual.

From a systemic point of view, the first effect of untreated periodontal disease is very obvious, that is, if one loses enough teeth, then it affects the ability to chew, and this could ultimately have an adverse effect on the diet. Periodontal disease also may be a risk factor for bacterial endocarditis. This is long known, that if you do interventions in the mouth and there are bacteria in the region of the gingiva around the tooth it is possible to mechanically introduce bacteria into the bloodstream so that individuals at risk for bacterial endocarditis have a small but finite possibility of developing it. This is why patients at risk often are given an antibiotic prophylactically prior to invasive dental procedures. The relationship that's been most thoroughly demonstrated over the years is the relationship between periodontitis and diabetes. It was mentioned earlier that patients with poorly controlled or uncontrolled diabetes have an increased susceptibility to infections of various types and this certainly applies to periodontal disease as well. Much of the work demonstrating this was done in the 70s with studies on the Pima Indians in Arizona, who have a very high prevalence of type 2 diabetes. In fact, at one point, and possibly still today, periodontitis was considered to be one of the complications of diabetes.

There is some recent work showing an association between advanced periodontitis and coronary heart disease, stroke, pneumonia and preterm, low birth weight babies. And you will recall that earlier today, people talked about low birth weight as

having an influence both on subsequent development of coronary artery disease and dysfunctions in insulin activity. Now it was mentioned that with respect to coronary heart disease, for example, most of the evidence to date consists of epidemiologic studies in which there were associations shown which do not in themselves imply causality, and that until there are studies done to show that if you intervene and treat the periodontitis, there will be a decreased incidence of MIs, for example, one can't say for certain that periodontitis is a risk factor for coronary heart disease. I should note that there is a controlled clinical study currently underway, funded by the National Institute of Dental and Craniofacial Research which is a prospective treatment study looking at whether treating periodontitis in patients that already have had one MI episode can prevent or reduce further episodes.

As we said, periodontitis is caused by an accumulation of dental plaque, that is bacterial accumulations on teeth. We've heard this morning about such factors as tobacco use and betel chewing as potential etiological factors for other lesions, including oral cancer, and they are risk factors or exacerbating factors for periodontitis, as well. Now the thing about periodontal disease is that it can be prevented by very low tech methods, namely, maintaining good oral hygiene. And we'll talk about what that means shortly. Let's look at this a slide of healthy gingiva. This is what we like to see, and so what are some of the changes that one begins to see with the onset of periodontal disease and why are they relevant? Well, periodontitis starts as gingivitis, or inflammation of the gum tissue, which as you can see in this slide is characterized by redness, by changes in the tissue architecture such as swelling, and by bleeding on gentle probing of the tissue or while brushing. These are some of the early signs of periodontal disease that are pretty well limited to the soft tissue surrounding the teeth. If the disease is not controlled at this point, some cases will progress to periodontitis. This is the disease that affects the support of the teeth, so bone that supports the teeth begins to be lost and the attachment of the tooth to the supporting bone becomes progressively reduced. Often the gum tissue does not recede at the same rate as the tooth support is lost, and as a result deep spaces, or periodontal pockets, develop between the tooth and the remaining gum tissue. For example, in this slide the pocket is 8 millimeters in depth. The reason this is important is because this is a bacterial disease and bacteria are continually accumulating along the

root surface within that pocket. This slide presents is an example of what might result. This radiograph shows a normal situation with respect to bone level, and this is an example of rather advanced periodontal disease, so you can see the amount of support that's been lost along these teeth. And imagine, then, if the gum level were still up about here where it started - this whole depth is the pocket, or deepened space, and there are dental plaque bacteria accumulating along these surfaces. This slide shows a light micrograph of dental plaque. The tooth surface and this is covered with bacteria, perhaps as many as 10 to the fifth or sixth of bacteria per square millimeter. And this is a scanning electron micrograph showing various complex configurations of filamentous bacteria, cocci, and other organisms in dental plaque. When we talk about control of plaque and its effect on the disease, this is an extreme example but an illustrative one. This is a patient we had seen who was obviously not brushing this area and as a result of extensive plaque accumulation very severe gingival inflammation developed. The bacterial plaque was removed and the tooth was polished. This happened to be a patient living in a group home and her caregivers were instructed how to clean these teeth without causing discomfort. Within two months the tissue looked like this, quite healthy. All that was done was to remove and control the plaque accumulations. So when we talk about prevention as a low tech process, this is a graphic example of what can be achieved with mechanical plaque removal methods alone.

Now how does this all relate to systemic disease? If you look at these diagrams, these are cross-sections through the tooth and the adjacent bone and soft tissue. We start off with a relatively healthy situation with a very shallow space between the gum and tooth, perhaps 3 mm or less in depth. If plaque is allowed to accumulate at the gum line, the space becomes a little bit deeper as a result of the inflammatory response, fibers that connect the tooth to the soft tissue and bone are destroyed, the pocket gets progressively deeper and finally, in a more advanced disease stage, you can see the base of the pocket approaching the tip of the tooth root. This deep pocket allows plaque to accumulate and, more importantly, the wall of this pocket often becomes ulcerated. As a result of this ulceration, bacteria and/or their products can very readily penetrate the soft tissue and gain access to the systemic circulation. It's been estimated, just to give you an example, that assuming somebody had all their teeth, the teeth were all affected with

advanced disease and the walls of all the pockets were ulcerated (a worst case scenario), the area of underlying soft tissue that would be exposed would be approximately 5 to 8 square centimeters. So this gives you some idea of the potential area of access by which bacteria or their products can enter the systemic circulation.

With respect to prevalence of periodontal disease in South Asian populations, there are not a lot of data. This table was derived from a website accessed through the WHO site, and these are examples of some epidemiologic studies that were conducted. For the most part, they're not recent studies and the age ranges are fairly restricted. But if you look at them, there still are quite high percentages of individuals in these countries that were found to have periodontitis. We're not talking about gingivitis now, we're talking about moderately advanced and advanced periodontitis where there is significant bone loss and the opportunity for bacteria to colonize considerable areas of root surface within deep periodontal pockets.

When we consider disease prevention or control, this can be accomplished very simply by daily thorough removal of dental plaque by tooth brushing, cleaning between the teeth with dental floss or some other device for this purpose and, if necessary, by the use of adjunctive aids such as antimicrobial mouth rinses or toothpastes, as well as by the reduction, and preferably cessation, of tobacco use. In addition, one should seek periodic professional care, and gain control of systemic diseases that may enhance susceptibility. Thus, for example, if you have poorly controlled diabetes it predisposes you to periodontal disease, and conversely, there is evidence to suggest that if you can control the periodontitis, you can more readily control the diabetes.

Lastly I want to talk about some of the proposed mechanisms. How is it that periodontal disease can have these systemic influences? The first, of course, is that the actual periodontal pathogens themselves and/or their products can gain access to the systemic circulation through ulcerated walls of periodontal pockets and exert systemic effects. One of the bacterial products that has been most frequently associated with systemic effects is endotoxin associated with the Gram- negative organisms that are the etiologic organisms in periodontitis. It's also been demonstrated that there's an increase in C-reactive protein (CRP) levels with periodontal disease and that if treat the periodontitis is treated, the level of CRP is reduced. The role that CRP can have in

coronary artery disease was discussed this morning. Some studies have also shown that oral bacteria or traces of oral bacteria can sometimes be found in atheromatous plaques, although the significance of this is not yet entirely clear. With respect to the relationship of periodontal disease to pneumonia, this relates to studies that have shown, basically in nursing home patients, that fragments of dental plaque can be dislodged and carried to the bronchial tree. And finally, as I mentioned, there are prospective interventional clinical trials underway to confirm the role of periodontitis in systemic disease, particularly coronary heart disease and also with respect to preterm, low birth weight babies.

In summary, then, it's now generally recognized that the mouth is connected to the rest of the body and that relationships between oral and systemic diseases may be significant. Oral health, as a result, should be a significant component of public health initiatives. Oral and systemic diseases may often have risk factors in common, for example, smoking. And, finally, current oral health data for South Asian-American communities should be obtained in order to develop effective, culturally-relevant oral health program. One last thing I want to mention is that there's a section toward the end of the manual that contains additional resources. These include a paper in which I summarize a meeting that the Sunstar Company held with WHO about two years ago for NGOs, non-dental NGOs, with the idea of getting oral care on the agenda of many countries that don't yet include it. I refer you to that paper as it contains a lot more information about the kinds of things I spoke to you briefly about today. Thank you for your attention.