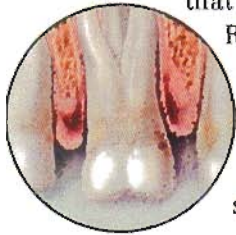


# Helping Patients Understand the Suspected Link Between Gum Disease and Heart Attack/Stroke

**A**s your health-care providers, we believe that patient education is one of the best ways we can help you stay healthy. Therefore, we would like to share with you that there is a growing body of research that suggests that infection from the oral cavity may increase the risk and complications for a number of serious diseases and conditions. Heart disease and stroke are among these. Although this research is relatively new and there are a number of questions which remain unanswered at this time, it does appear that there may be a link between gum disease and increased risk for heart disease and stroke.



Research to better understand the relationship between gum disease and cardiovascular diseases such as heart disease and stroke is currently underway. While we wait for the findings of this research, it is important to identify those individuals who may be at greater risk for heart disease or stroke because of undiagnosed and untreated gum infection. First, it is important to point out the risk factors for heart disease and stroke which medical research has already identified.

## What are the most highly recognized risk factors for heart disease or stroke?

The American Heart Association has identified certain factors that increase the risk of heart and blood vessel diseases. These include the following:<sup>1</sup>

- Increasing age
- Family history of premature coronary artery disease
- High blood pressure
- Low HDL cholesterol
- Obesity and overweight
- African American ethnicity
- Alcohol
- Male gender
- Tobacco smoke
- High LDL cholesterol
- Diabetes
- Physical inactivity
- Stress



It has been estimated that each year 250,000 sudden deaths from coronary heart disease occur before the victim reaches the hospital. For many of these victims there was no previous recognition of cardiovascular diseases;<sup>2</sup> therefore, it is extremely important that you discuss these risk factors and your specific risk profile with your medical care provider. It is also significant that of the 1.5 million heart attacks and 600,000 strokes that occur in the U.S. each year, almost half will affect people who appear to be healthy with normal or low cholesterol levels.<sup>3</sup> As a result, scientists are now searching for other risk factors for heart disease and stroke. Whether gum disease is categorized as a risk factor for heart disease and stroke remains undetermined at this time. So what do we already know about how gum infections may affect cardiovascular health?

## How might gum disease affect cardiovascular health?



Diseases of the heart and blood vessels are most commonly related to thickening of the walls of arteries, a condition called atherosclerosis. It is believed that atherosclerosis results from damage to the artery wall that, in turn, results from inflammation within the artery wall along with deposits of fat. The combination of fat deposits and artery wall inflammation leads to the development of an "atheroma" or plaque.

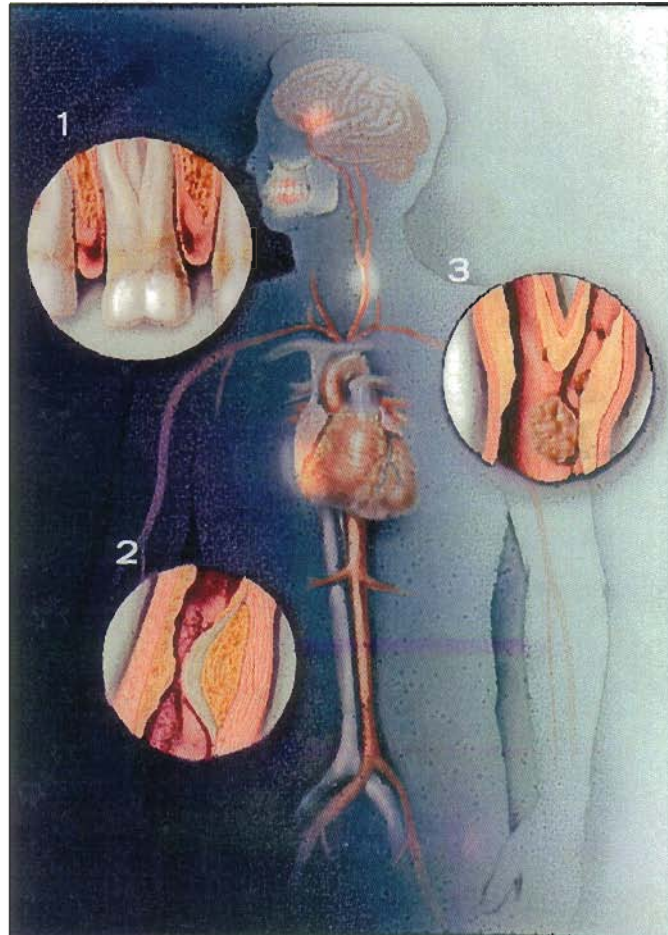
Part of this inflammatory damage is from infections of various sources. Many researchers believe that bacteria from gum infections (illustrated in circle 1) could be one of the infec-

tions involved with this injury to the artery wall. Bacteria cause an inflammatory tissue response that allows the bacteria to enter the blood stream from the gum pockets. Simply put, when your gums bleed, a path for bacteria to enter your blood stream is created. This bacteria can move through blood vessels to distant sites in the body, including the heart. When this happens the artery becomes less elastic and the inside of the artery becomes smaller and smaller (illustrated in circle 2). What happens next is small blood clots may form (illustrated in circle 3) and arteries get clogged which causes blood flow to be cut off. This results in a heart attack or stroke depending on the location of the blood clot. The role that gum disease plays in this process is an area of research which is under investigation at this time. In the meantime it is important for you to recognize the following warning signs of gum disease.<sup>4</sup>

### What are the warning signs of gum disease?

- Gums that bleed during brushing or eating
- Increased space that starts to develop between teeth
- Gums that feel swollen or tender
- Gums that are receding (pulling back from your teeth)
- Persistent bad breath
- Pus between your teeth and gums
- Changes in the way your teeth fit together when you bite
- Sores in your mouth

You should discuss warning signs of gum disease and risk factors for heart disease with your dental- and medical-care providers, and it is recommended that adults be evaluated by their dentist or dental hygienist for periodontal disease. More information about gum disease and its relationship to cardiovascular disease may be found on the Web site of the American Academy of Periodontology, which may be accessed at [www.perio.org](http://www.perio.org). More information on heart disease and stroke may be accessed from the American Heart Association at [www.americanheart.org](http://www.americanheart.org); the Web site of the National Heart, Lung and Blood Institute at [www.nhlbi.nih.gov/index.htm](http://www.nhlbi.nih.gov/index.htm); and from the American College of Cardiology at [www.acc.org](http://www.acc.org).



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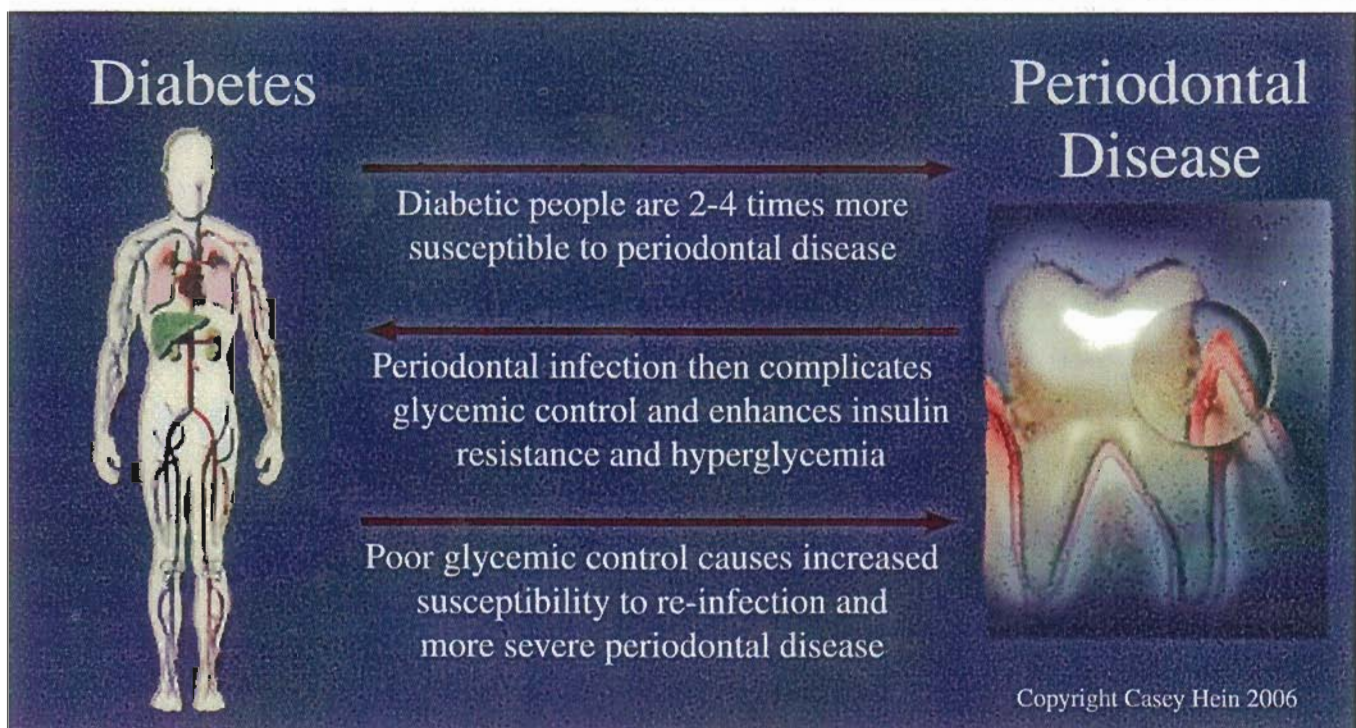
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## Helping Patients with Diabetes Understand the 2-Way Relationship Between Diabetes and Gum Disease

**M**ost people think of gum disease, or periodontal disease, as an infection localized to the oral cavity with tissue destruction confined to the mouth. However, mounting research over the last 20 years provides evidence that pathways of inflammation link oral infections, such as periodontal disease, to whole body damage. The strongest evidence of a link relates to diabetes and periodontal disease. Periodontal disease is often referred to as the sixth long-term complication of diabetes, but it often goes unrecognized by physicians who treat diabetic patients. People with diabetes are much more susceptible to periodontal disease and once periodontal disease is established in a diabetic patient, metabolic control (glycemic control or blood sugar levels) of diabetes is complicated from the constant reservoir of gram-negative anaerobic bacteria that sit at the bottom of the gum pockets producing infection and low grade inflammation throughout the body. That is why the relationship between diabetes and periodontal disease is sometimes referred to as a two-way street, and the reason why diagnosis and treatment of periodontal disease, just like optimal glycemic control, are essential in the medical management of diabetes.

### *What does glycemic control have to do with periodontal disease?*

Diabetic patients who have good control over blood sugar levels (good glycemic/metabolic control) can prevent or delay the onset and slow the progression of the complications associated with diabetes, particularly retinopathy, nephropathy, and neuropathy. The same is true for delaying the onset or slowing the progression of periodontal disease. However, for people with diabetes who have poor glycemic control (high blood sugar levels), the risk of infection becomes much greater. For instance, it is estimated that poorly controlled diabetic people are at a 2 to 4 times greater risk for developing periodontal infection than non-diabetic people. That is why it is important for diabetic patients to achieve and sustain the same level of glycemic control as a healthy, non-diabetic individual. Good glycemic control, an HbA1c value of less than 6% for most patients, significantly reduces the risk for the serious complications of diabetes noted above. Another important aspect of this 2-way street is the research that suggests chronic periodontal infection causes systemic inflammation that enhances insulin resistance and hyperglycemia. Insulin resistance makes it difficult for patients and their physicians to achieve and sustain optimal glycemic control, and increases the risk for coronary heart disease.



*What happens if I have periodontal disease and it is not treated?*

Most importantly, when a periodontal infection goes untreated in diabetic patients, this puts them at greater risk for developing the long-term complications associated with diabetes and cardiovascular disease. There is also research to suggest that insulin-dependent diabetic individuals may be genetically predisposed to an exaggerated inflammatory response to gram-negative bacterial infections like those found in periodontal disease.

Currently there is no cure for diabetes or periodontal disease, but if you are a motivated patient who complies with your dental and medical providers' recommendations, these diseases can be controlled. Successful management of these diseases requires frequent monitoring of and careful attention to your immune system's response to treatment, and monitoring of both glycemic control (blood sugar levels) and periodontal status.

*"What kind of recommendations will my physician and dentist make to manage my diseases?"*

The following are recommendations often provided by healthcare providers to successfully control diabetes and periodontal disease:

- Maintain excellent oral hygiene including thorough brushing with a toothpaste that contains triclosan/copolymer at least twice a day, the use of dental floss daily, and tongue brushing
- Undergo the treatment that your dentist or dental hygienist recommends for active periodontal disease
- Take all medications prescribed by physicians and dentists as indicated
- Have regular periodontal maintenance visits that include periodontal evaluation and re-treatment as needed
- Commit to smoking cessation if applicable
- Engage in adequate physical activity
- Reduce weight, if applicable
- Eat balanced meals with proper nutrition
- Comply with your healthcare provider's recommendations for HbA1c testing at least every 3 months, and request copies of the results be forwarded to your dentist, which allows your dental care provider to monitor your glycemic control against your periodontal status.

This level of diabetes care is best facilitated by a team of healthcare providers from both medicine and dentistry including physicians, nurses, diabetes educators, dieticians, dentists, dental hygienists, and a number of other specialists. More information on the relationship between diabetes and periodontal disease may be accessed through the Web site of the American Academy of Periodontology, found at [www.perio.org](http://www.perio.org).

## Alerting Patients About the Role of Obesity in Increasing the Risk for Gum Disease

**O**besity, which is now considered a chronic disease, substantially increases the risk for high blood pressure; dyslipidemia; type 2 diabetes; coronary heart disease; stroke; gallbladder disease; osteoarthritis; sleep apnea and respiratory problems; and endometrial, breast, prostate, and colon cancers. Recent research indicates that obesity also increases the risk for periodontal disease and it may be insulin resistance that regulates the relationship between obesity and periodontal disease.

The classifications of being overweight and obese now apply to more than 60% of American adults and nearly 80% of some high-risk subgroups, such as African-American women, placing these individuals at greater risk for diabetes and cardiovascular disease. Some authorities estimate that 2 out of 3 Americans are overweight or obese, and projections of obesity trends for the next 25 years are even more alarming.

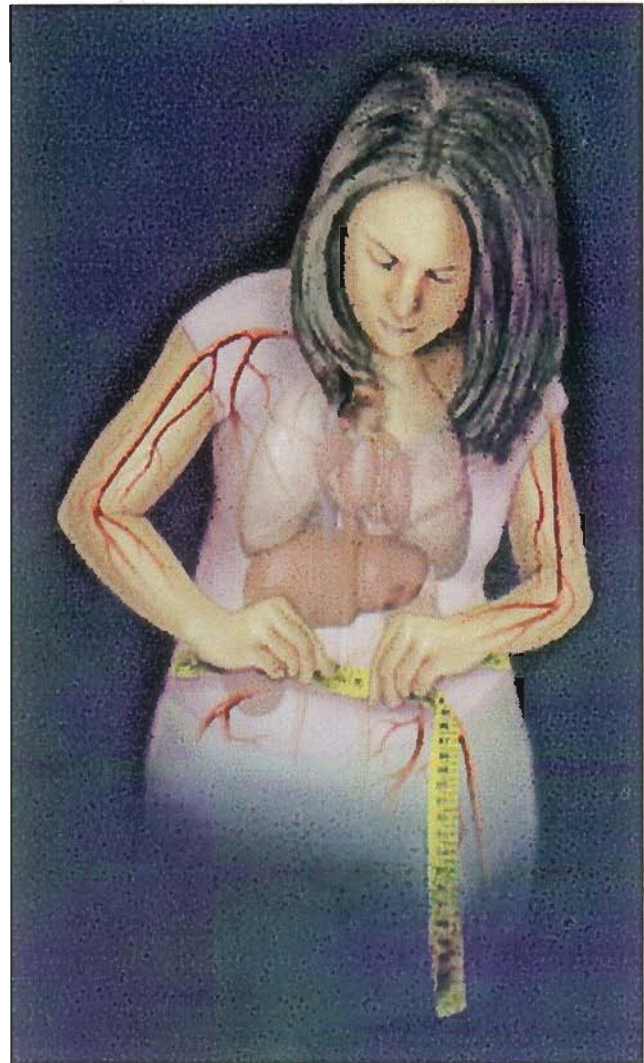
*Abdominal obesity may be a bigger problem than most people realize.*

Abdominal obesity (sometimes called central adiposity), defined as waist circumference of greater than 40 inches in men and greater than 35 inches in women, increases the risk of developing diabetes by 3.5 fold after adjusting for body mass index (BMI). More recent research indicates that waist-to-hip ratio, BMI, fat-free mass, and subcutaneous fat (central adiposity) are significantly correlated with periodontal disease. This suggests that abnormal fat metabolism might play a role in the development of periodontal disease. In fact, some researchers have concluded that in younger populations (18 to 34-years-old age group) overall abdominal obesity is associated with increased risk for periodontal disease; specifically, those individuals with abdominal obesity (high waist circumference as defined above) are over twice as likely to have periodontal disease than those without abdominal obesity. This means that abdominal obesity may now be considered a risk factor for periodontal disease, especially in younger individuals.

Additional research recently reported that periodontal infection contributes to insulin resistance and the severity of periodontal disease increases proportionately with increasing insulin resistance. It was also found that people who have a higher BMI produce certain chemicals that lead to systemic inflammation and insulin resistance, which predisposes individuals to diabetes.

*Why is insulin resistance such a big deal?*

Insulin is a hormone secreted by the pancreas that allows molecules of sugar (glucose) in blood to pass into cells where the glucose is either used for energy or stored for future use. Insulin resistance occurs when the normal amount of insulin secreted by the pancreas is not able to unlock the door to cells to allow glucose to enter cells. In an attempt to overcome this and maintain a normal level of blood sugar, the pancreas secretes more and more insulin. In some cases cells resist or refuse to respond even with the higher levels of insulin. This causes glucose (sugar) to build up in the blood. Once a person becomes insulin resistant,



they are at increased risk for type 2 diabetes. People with diabetes are at a 2 to 4 times greater risk for developing periodontal disease than non-diabetic people. It appears that insulin resistance may be the link between obesity and other inflammatory conditions, including periodontal disease.

To consider whether you might be at risk for periodontal disease, take your own measurements for central adiposity and calculate your BMI. Waist circumference of greater than 40 inches in men and greater than 35 inches in women, and BMI of greater than 30 kg/m<sup>2</sup> may signal increased risk for periodontal disease and possibly increased risk for insulin resistance. A table to calculate your BMI is presented below. More information on the relationship of obesity, insulin re-

sistance, and periodontal disease can be accessed through the Web site of the American Academy of Periodontology, found at [www.perio.org](http://www.perio.org).

Healthy nutrition and appropriate physical activity may prevent or decrease the rate of progression of periodontal disease, and other chronic inflammatory diseases and conditions. Because of the relationship between insulin resistance and these serious inflammatory diseases, there is heightened concern for people who are edging toward insulin, often accompanied by being overweight or obese. It is important to speak with your healthcare providers to discover if you may be at risk for insulin resistance, type 2 diabetes, and periodontal disease.

Body Mass Index Table

BMI	Normal					Overweight					Obese					Extreme Obesity																					
	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	
Height (inches)	Body Weight (pounds)																																				
58	91	96	100	105	110	115	119	124	129	134	138	143	148	153	158	162	167	172	177	181	186	191	196	201	205	210	215	220	224	229	234	239	244	248	253	258	
59	84	89	94	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265
60	97	102	107	112	118	123	128	133	138	143	148	153	158	163	168	174	179	184	189	194	199	204	209	215	220	225	230	235	240	245	250	255	261	266	271	276	
61	100	106	111	116	122	127	132	137	143	148	153	158	164	169	174	180	185	190	195	201	206	211	217	222	227	232	238	243	248	254	259	264	269	275	280	285	
62	104	109	115	120	126	131	136	142	147	153	158	164	169	175	180	186	191	196	202	207	213	218	224	229	235	240	246	251	256	262	267	273	278	284	289	295	
63	107	113	118	124	130	135	141	146	152	158	163	169	175	180	186	191	197	203	208	214	220	225	231	237	242	248	254	259	265	270	278	282	287	293	299	304	
64	110	116	122	128	134	140	145	151	157	163	169	174	180	186	192	197	204	209	215	221	227	232	238	244	250	256	262	267	273	279	285	291	296	302	308	314	
65	114	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204	210	216	222	228	234	240	246	252	258	264	270	276	282	288	294	300	306	312	318	324	
66	118	124	130	136	142	148	155	161	167	173	179	186	192	198	204	210	216	223	229	235	241	247	253	260	266	272	278	284	291	297	303	309	315	322	328	334	
67	121	127	134	140	146	153	159	166	172	178	185	191	198	204	211	217	223	230	236	242	249	255	261	268	274	280	287	293	299	306	312	319	325	331	338	344	
68	125	131	138	144	151	158	164	171	177	184	190	197	203	210	216	223	230	236	243	249	256	262	269	276	282	289	295	302	308	315	322	328	335	341	348	354	
69	128	135	142	149	156	162	169	176	182	189	196	203	209	216	223	230	236	243	250	257	263	270	277	284	291	297	304	311	318	324	331	338	345	351	358	365	
70	132	139	146	153	160	167	174	181	188	195	202	209	216	222	229	236	243	250	257	264	271	278	285	292	299	306	313	320	327	334	341	348	355	362	369	376	
71	136	143	150	157	165	172	179	186	193	200	208	215	222	229	236	243	250	257	265	272	279	286	293	301	308	315	322	329	338	343	351	358	365	372	379	386	
72	140	147	154	162	169	177	184	191	199	206	213	221	228	235	242	250	258	265	272	279	287	294	302	309	316	324	331	338	346	353	361	368	375	383	390	397	
73	144	151	159	166	174	182	189	197	204	212	219	227	235	242	250	257	265	272	280	288	295	302	310	318	325	333	340	348	355	363	371	378	386	393	401	408	
74	148	155	163	171	179	186	194	202	210	218	225	233	241	249	256	264	272	280	287	295	303	311	319	326	334	342	350	358	365	373	381	389	396	404	412	420	
75	152	160	168	176	184	192	200	208	216	224	232	240	248	256	264	272	279	287	295	303	311	319	327	335	343	351	359	367	375	383	391	399	407	415	423	431	
76	156	164	172	180	189	197	205	213	221	230	238	246	254	263	271	279	287	295	304	312	320	328	336	344	353	361	369	377	385	394	402	410	418	426	435	443	

Source: Adapted from Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report.