1. Sleep apnoea paves the way for diabetes

According to a French study to be published in the July issue of the European Respiratory Journal (ERJ).

On the basis of a study involving nearly 700 snorers, a team from the Angers University Hospital (France) has demonstrated a link between obstructive sleep apnoea and metabolic disorders leading to diabetes, regardless of the subject's age or weight. The French team also found 40% of the diabetics, identified by the study, had not been previously diagnosed.

Obstructive sleep apnoea syndrome, which has been long ignored or simply neglected by doctors, is now increasingly the subject of many original studies, some of which are leading to fascinating discoveries.The condition, which leads to a repeated interruption of breathing during sleep and has serious adverse effects on health, affects up to 10% of middle-aged men. In addition to disturbing sleep patterns and causing daytime sleepiness and lack of concentration, it can impact, sometimes severely, on the cardiovascular system.

Sleep apnoea is understood to be more frequent among obese subjects aged over 40, who also represent a risk group for diabetes and cardiac problems. So the doctors at the Sleep Disorders Unit in the Department of Pneumology of Angers University Hospital decided to find out whether the metabolic disorders that normally lead to diabetes, such as glucose intolerance and insulin resistance, were actually commoner among sleep apnoea sufferers.

Almost 700 snorers screened

Over a three-year period, Nicole Meslier, Jean-Louis Racineux and their colleagues assessed all male snorers referred to them by a GP for suspected sleep apnoea syndrome. More than nine out of every ten (91%) complained that they snored almost every night, 50% suffered from poor quality sleep, and 85% had problems with daytime hypersomnolence.
The team decided to study only male subjects, who suffer from sleep apnoea syndrome much more frequently, in order to avoid methodological bias. Their eventual subject group consisted of 682 men.
All of the snorers were monitored, using standard nocturnal sleep polysomnography, to see whether there were breaks in their breathing of up to ten seconds.
If a subject was found to stop breathing more than ten times per hour, he was diagnosed with sleep apnoea. The same diagnosis was applied to those whose respiratory flow decreased by 30% or more just before they woke during the night.

The following morning, the team screened each subject for diabetes using the normal procedures, i.e. by measuring fasting blood glucose levels and then blood glucose levels two hours later, after administration of 75 g of glucose. "The WHO scale indicates that fasting blood glucose of over 7.0 mmol/l or blood glucose levels of 11.1 mmol/l or over

following glucose consumption indicate diabetes", Nicole Meslier explains in the July's ERJ. "And values between 7.0 and 11.1 mmol/l inclusive following consumption of 75g of sugar point to glucose intolerance, an earlier stage in the development of diabetes."

Quite a shock

The diagnosis of sleep apnoea syndrome was confirmed in 494 subjects of the 595 for whom a full set of data was collected. "Their average age (55.6 years), their above-average weight (mean BMI of 30.1) and their cardiovascular health (42% had arterial hypertension) corresponded to the typical profile for apnoea sufferers", the authors note.

The real shock came from the diabetes figures. The Angers team concludes that subjects with sleep apnoea syndrome are twice as likely to be diabetic (30.1% against 13.9%) than non-apneic snorers, and their glucose intolerance rates are higher by almost 50%. Overall, half of the apnoea sufferers presented a diabetes-related metabolic disorder, as opposed to just over a quarter of the ordinary snorers.
"What's more", Meslier adds, "the degree of insulin resistance correlated with the severity of the sleep apnoea. This relationship between sleep apnoea and diabetes cannot be explained by the known risk factors, such as age and weight, which we factored into our statistical analysis, even though our apneic patients were, on average, heavier than the ordinary snorers."

Cause needs investigation

If age and weight cannot provide an explanation, why are we seeing higher rates of diabetes and glucose intolerance in subjects with sleep apnoea?

The authors of the ERJ article can only conjecture as to the reason. But there are data which suggest that the fall in blood oxygen caused by interrupted breathing could pave the way for metabolic problems. Recent studies have even shown that, where nocturnal breathing difficulties are corrected through the use of a mask providing additional ventilation, this can reduce the arterial hypertension associated with a drop in blood oxygen concentration.
So, as the research team suggests in July's ERJ, it may be the case that glucose intolerance contributes to the cardiovascular problems affecting subjects with sleep apnoea.

Glucose testing a priority in apnoea subjects

The Angers researchers are now studying the various effects of sleep apnoea treatment to see whether it can correct diabetes-related metabolic disorders.
Further work needs to be carried out to determine whether, as they expect, the same link between sleep apnoea and diabetes is present in women, who are normally under-

represented in clinical studies but in fact represent 20 to 25% of sleep apnoea syndrome sufferers.

In more specific terms, the ERJ article's authors stress that subjects with sleep apnoea must systematically be screened for diabetes.
"No less than 40% of the diabetics among our apneic patients were diagnosed for the first time during our study", emphasises Jean-Louis Racineux. "So it would seem reasonable for apneics' fasting blood glucose levels to be tested systematically."

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2. Title: **Sleep Apnea Linked To Increased Diabetes Risk**

URL: http://www.pslgroup.com/dg/FC0B2.htm
Doctor's Guide
May 6, 1999

LOS ANGELES, CA -- May 6, 1999 -- Adults who suffer from obstructive sleep apnea are three times more likely to also have diabetes, according to a new UCLA School of Dentistry/Department of Veterans Affairs study published today in the *Journal of Oral and Maxillofacial Surgery*.

Sleep apnea, a serious condition marked by loud snoring, irregular breathing and interrupted oxygen intake, affects an estimated nine million Americans. The culprit? Carrying too many extra pounds.

"The blame falls squarely on excess weight gain," said Dr. Arthur Friedlander, associate professor of oral and maxillofacial surgery at the UCLA School of Dentistry and associate chief of staff at the Veterans Affairs Medical Center in Los Angeles.

Surplus weight interferes with insulin's ability to propel sugars from digested food across the cell membrane, robbing the cells of needed carbohydrates. Diabetes results when glucose builds up in the bloodstream and can't be utilised by the body.

Being overweight can also lead to obstructive sleep apnea, Friedlander explained.

"When people gain too much weight, fatty deposits build up along the throat and line the breathing passages," he said. "The muscles in this region slacken during sleep, forcing the airway to narrow and often close altogether."

Reclining on one's back magnifies the situation.

"When an overweight person lies down and goes to sleep gravity shoves the fat in the neck backwards," he said. "This blocks the airway and can bring breathing to a halt."

Friedlander tested the blood sugar of 54 randomly selected male veterans whom doctors had previously diagnosed with obstructive sleep apnea. He discovered that 17 of the 54 patients, or 31 percent, unknowingly suffered from adult-onset diabetes.

Using the same sample, Friedlander also took panoramic X-rays of the men's necks and jaws. The X-rays indicated that 12 of the 54 patients, or 22 percent, revealed calcified plaques in the carotid artery leading to the brain. These plaques block blood flow, significantly increasing patients' risk for stroke. Seven of the 12, or 58 percent, were also diagnosed with diabetes.

In dramatic comparison, the 17 patients diagnosed with diabetes showed nearly twice the incidence of blockage. Seven of the 17 men, or 41 percent, had carotid plaques. Only five of the 54 patients who displayed plaques did not have also diabetes.

If he conducted this study today Friedlander said he would likely find a higher number of diabetic patients. After he completed the study in 1997, the American Diabetes Association lowered its definition for diabetes from 140 to 126 milligrams of sugar per decilitre of blood.

"This is the first time that science has uncovered a link between sleep apnea and diabetes," Friedlander said. "The data suggest that someone afflicted with both diabetes and sleep apnea is more likely to suffer a stroke in the future.

"Persons going to the doctor for a sleep-apnea exam should request that their blood be screened for diabetes, especially if they are overweight."

More than half of the individuals who develop diabetes as adults will need to modify their diet and take daily insulin in order to control the disease, he added.

3.

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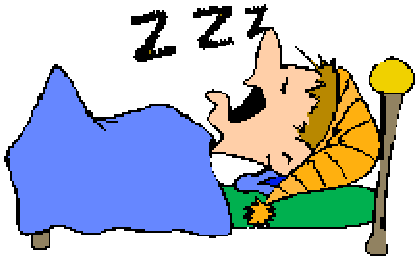
The online Sleep Apnea Newsletter is published six times a year.

Diabetes and Sleep Apnea: Is there a connection??

You are aware of sleep apnea but did you know many people with sleep apnea also have diabetes. What is it?



Diabetes is the failure of the pancreas to make enough insulin for your body or a resistance of the body to use the insulin produced. Insulin helps carry glucose or sugar to the cells to supply energy to tissue and muscles. Diabetes is a chronic, incurable condition but can be controlled.

Type 2 diabetes usually begins later in life (affecting people over 40) and may be controlled by diet, pills or insulin injections. The symptoms are blurred vision, excessive thirst, passing urine frequently, excessive hunger, tiredness, feeling out of sorts and weight loss. Sometimes people who are on large amounts of Prednisone may develop diabetes. Type 2 diabetes comes on gradually and may be undiagnosed and untreated, allowing complications such as kidney failure and loss of eyesight to develop.

If you have these symptoms or you are obese you may want to talk to your doctor about getting tested. Your doctor can order a glucose tolerance test to determine if you have diabetes as well as discuss what treatment is needed to control it.

Research shows that prevalence of diabetes increases with the degree of obesity so the more overweight the person the greater chance of having diabetes. (Ref. Erem C et al 2001)

In another study by Al-Delaimy WK in Harvard School of Public Health, research showed a consistent association between snoring and Type 2

diabetes.

In men aged 30-69 years, habitual snoring is associated with an increased incidence of diabetes within 10 years. Although obesity is the main risk factor for developing diabetes, habitual snoring may add to this hazard. (Ref. Elmasry A J Intern Med 2000)

A study done in 2000 by Chasens ER et al in Detroit, Michigan showed that people with diabetes and those reporting daytime sleepiness had a three to four fold risk of sleep apnea. They also showed that diabetics had more trips to the bathroom during the night and in general their self-rated health was decreased.

The most common conditions associated with obesity are diabetes, high blood pressure, heart disease, sleep apnea and other respiratory problems. While some of the studies focus on those who have diabetes and then develop snoring or sleep apnea, others deal with those who have sleep apnea and also develop diabetes. This is an area that is receiving a lot of attention in the scientific community and more research is on the way.

In the meantime the best non-medical treatment for sleep apnea is weight control.

- Some people have apneas during sleep but have no daytime symptoms. Those people do not have sleep apnea syndrome.
- 30% of people snore. Snorers are more sleepy in the daytime than non-snorers.
- Sleep apnea carries a 1 to 3 fold risk of having high blood pressure.
- Weight control is the best non-medical treatment for sleep apnea. A 1% reduction in weight means a 3% reduction in apneas.

4. Diabetes More Common in Snorers, Problem Sleepers

New York City, NY - July 4, 2003 (Reuters Health)

New research shows that a pre-diabetic condition and full-fledged diabetes occur more frequently in people who snore or who have a sleep disorder called sleep apnea.

Sleep apnea is associated with a higher-than-average risk of cardiovascular disease, and these findings suggest that the relatively high prevalence of diabetes and a pre-diabetic condition known as insulin resistance among people with the sleep disorder may be to blame.

Obstructive sleep apnea, the most common form of sleep apnea, is caused by a collapse of tissues in the throat during sleep, leading to numerous, brief interruptions in breathing.

The condition has been linked to high blood pressure and increased risks of heart attack and stroke, and is more common among overweight and obese individuals.

Besides loud, heavy snoring, symptoms of sleep-disordered breathing include daytime sleepiness, morning headaches and energy loss.

During the current study, reported in the European Respiratory Journal, Dr. Nicole Meslier of the University Hospital in Angers, France, and colleagues tested 595 men suspected of having obstructive sleep apnea to determine whether they, in fact, had the disorder.

The researchers then performed additional tests to see whether participants had insulin resistance or full-blown type 2 diabetes -- the most common form of diabetes, often associated with obesity.

In insulin resistance a person loses his or her ability to use this key blood-sugar-regulating hormone effectively.

A total of 494 men suspected of having sleep apnea did have the condition, while another 101 men were simply diagnosed as snorers. Among men with sleep apnea, 30 percent were diagnosed with type 2 diabetes, and 20 percent showed signs of being resistant to insulin.

Among the snorers, 14 percent had type 2 diabetes, and another 14 percent were resistant to insulin.

In France, where the study was conducted, only four to nine percent of adults between ages 45 and 74 are diagnosed with type 2 diabetes, according to the report.

Insulin resistance "may contribute to the cardiovascular morbidity and mortality associated with obstructive sleep apnea syndrome," the authors write.

Source: European Respiratory Journal 2003;22:1-5.

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5. Sleep apnea can lead to diabetes

Reported by Susan Aldridge, PhD, medical journalist

People who have sleep apnea have a higher than average chance of having diabetes, say researchers in France.
In sleep apnea, the person stops breathing momentarily many times during the night and complains of snoring and poor sleep. Recent research has suggested that sleep apnea may also raise the risk of heart disease and stroke. A research team at Angers University, France, now reveal that those with sleep apnea are more likely to suffer from diabetes.

They tested glucose levels in a group of almost 700 men who'd been referred to their sleep clinic for snoring. Most had sleep apnea and, more alarmingly, around half proved to have either diabetes or a glucose control abnormality (insulin resistance) that might lead to diabetes. The severity of the insulin resistance increased with the severity of the sleep apnea.

Although many of the participants were overweight, this does not provide a complete explanation of the link between sleep apnea and diabetes. The researchers think that the fall in oxygen levels in the blood that occurs when breathing stops somehow disturbs glucose metabolism. They are now investigating whether sleep apnea treatment improves the diabetes. In the meantime, they recommend that those with snoring problems should be screened for diabetes.

Source
European Respiratory Journal July 2003

6. Sleep Apnea Linked with Diabetes, Endocrine Disorder

New research recently presented at the 86th Annual Meeting of The Endocrine Society on 40 women with polycystic ovary syndrome (PCOS) showed that those with sleep apnea may be at more risk for developing diabetes. PCOS is a female endocrine disorder that affects as many as 5% to 10% of reproductive-aged women. Symptoms of this condition, which ups a woman's risk of developing diabetes and cardiovascular disease, include excess hair growth, irregular menstruation, and central body obesity.

Researcher Esra Tasali, MD, concluded, "Sleep apnea appears to increase the incidence of hyperinsulinemia [abnormally high levels of insulin in an individual's blood] in women with PCOS. These findings indicate that women with PCOS who suffer from sleep apnea should be closely monitored for the development of diabetes."