

with other serious health risks. Comorbidities for OSA include heart disease, high blood pressure, diabetes, stroke, and obesity.<sup>9-15</sup> The US National Institutes of Health has listed OSA as an identifiable cause of hypertension, and studies indicate that 35% of all people with high blood pressure also have OSA.<sup>12</sup> This number increases to 80% for those taking three or more blood pressure medications.<sup>16</sup> OSA is associated with increased mortality among individuals with moderate or severe heart failure, and recent research shows that treating OSA improves cardiac function.<sup>17-19</sup> Among stroke victims, 60% also have OSA, and OSA is associated with higher mortality and lower functional outcomes for stroke survivors.<sup>15</sup> Approximately 50% of diabetes patients also have OSA, and

***Obstructive sleep apnea shares many symptoms with depression. These symptoms include daytime sleepiness, fatigue, and reduced motivation. ...studies have demonstrated that short-term treatment for OSA ... is associated with improvement of symptoms of depression.***

treatment of OSA has been shown to improve insulin sensitivity and postprandial glucose.<sup>13,20-21</sup> 77% of morbidly obese bariatric surgery patients have sleep apnea, and the treatment of sleep apnea may improve the ability to exercise and be more active.<sup>14</sup>

### **Depression and OSA**

A recent study has added long term evidence to the already-established links between OSA and depression. These researchers found that a large number of patients being referred to the center for evaluation of potential OSA had also been prescribed anti-depressant medicine prior to their referral. The incidence

of these types of referrals (39%), combined with the prevalence in those patients of symptoms suggesting the diagnosis of depression, appeared disproportionate to the incidence of depression in the general population.<sup>5</sup> This led the researchers to suspect that incidence of OSA might be misdiagnosed as depression, or that conversely the affects of OSA might express themselves in patients as clinical depression.

There is remarkable overlap between the common symptoms of OSA and clinical depression, to the point that a real difficulty appears for doctors in isolating which of the two conditions any given patient might have. Patients with OSA report symptoms including sleepiness and fatigue, irritability, and difficulty concentrating and with memory, all of which are common symptoms of depression.<sup>1,2,3,4,5</sup> Furthermore, all of these symptoms have been associated as well with a tendency toward social withdrawal and potential loss of enjoyment in work and other activities for OSA patients.<sup>22</sup> Whereas the particular cause of the symptoms may be difficult to determine, the association of the symptoms with both conditions suggests the necessity that OSA should be considered as a factor affecting both the expression and diagnosis (or mis-diagnosis) of clinical depression.

### **The mitigation of depression symptoms in OSA by sustained CPAP therapy**

Past studies by this group, as well as by other researchers, have indicated that CPAP therapy has led to the improvement of some symptoms of depression in patients during a short-term period (4-12 weeks).<sup>15</sup>

In a more recent study, however, patients diagnosed with OSA who also exhibited symptoms of depression were placed on consistent CPAP therapy and evaluated after the short (4-6 weeks) and long term (one year or longer). The results of the study show that both in the short and long term CPAP treatment in OSA patients was associated with a statistically significant improvement in the...

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