

The Painful Relationship Shared by Spinal Injury and Sleep Disorders

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SPINAL INJURY (SI)

Injury to the spinal region of the body routinely results in long term (and sometimes permanent) residual health effects that compromise quality of life (QoL).^{1,2} Indeed, spinal injury (SI) is most frequently cited as the source of chronic pain.³ In the extreme, SI results in paralysis. However, most SI is less critical. For the purposes of this presentation, we focus on SI cases that did not result in paraplegia. This sample includes SI caused by motor vehicle accidents, falls,



lifting/twisting, and sports injuries. Of these injuries 71% were in the cervical spine, 12% lumbar, and 17% in multiple locations. Numerous studies have demonstrated that pain associated with SI creates a multifaceted, cascading effect that detrimentally influences all aspects of health and well-being. ^{4,5,6} This intricate association causes psychiatric distress and creates destructive outcomes within the recovery process.

SLEEP DISORDERS (SD)

It is estimated that 25% of individuals worldwide experience sleep disorders (SD) which result in several adverse health effects such as stroke, diabetes, coronary events, hypertension, headaches, and weight gain.⁷ Moreover, many psychological disturbances are linked to sleep related problems.^{8,9}



SPINAL INJURY AND SLEEP DISORDERS

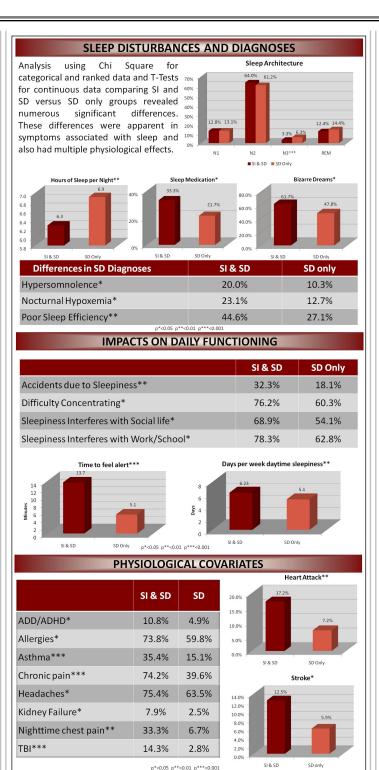
Individuals who sustain spinal injuries commonly complain of sleep disturbances. This coexistence negatively impacts general health, well-being, and recovery. Investigations of this complex relationship have been constrained by difficulty in acquiring valid data from people whose sleep disorder (SD) diagnoses are based on complete nocturnal polysomnography (NP) and multiple sleep latency tests (MSLT) rather than simple self-report data.

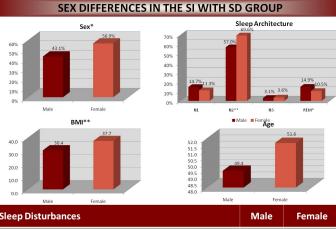


OUR APPROACH

We constructed an 111-item questionnaire to use in conjunction with NP, MSLT, the Epworth Sleepiness Scale (ESS), and medical chart reviews of people referred for evaluation of SDs. We analyzed data from 711 people (319 female, 392 male. Of these, 65 reported SI with SD (37 female, 28 male) ranging in age from 8-83 with a mean age of 50.65.







Sleep Disturbances	Male	Female
Feel Paralyzed **	36.0%	8.6%
Nightmares*	32.0%	62.2%
Sleep Walking*	0.0%	18.9%
Wake up screaming/yelling*	7.7%	30.6%
Wake with racing heart**	11.1%	85.7%
p*<0.05 p**<0.01 p***<0.001		

SEX DIFFERENCES IN PHYSIOLOGICAL COVARIATES			
	Male	Female	
Chronic lung disease*	7.7%	35.1%	
Diabetes*	7.1%	30.6%	
Difficulty breathing*	29.4%	65.2%	
Headaches*	60.7%	86.5%	
Severe heartburn/acid reflux*	34.6%	61.1%	
Thyroid Disease**	3.6%	29.7%	

p*<0.05 p**<0.01 p***<0.001 DISCUSSION

Our results suggest that the relationship shared by spinal injury and sleep disorders is multifaceted, coinciding with an array of other physiological functioning such as diabetes, kidney failure, allergies, heart attack and stroke. Our results further suggest that this concurrence exacerbates symptoms associated with both conditions. Individuals with both SI and SD experience significantly poorer sleep than those individuals with an SD only. Of particular concern is that people with SI and SD spend significantly less time in stage N3 which is the stage of sleep critical for physiological restoration. Additionally, psychological distress was evident in the SI and SD group. A comparison of males and females in the SI and SD revealed women experience more intense sleep disturbances and have a higher incidence of physiological disease symptomology. Further understanding of the relationship shared by SI and SD is necessary to facilitate best treatment practices for spinal injury as well as assist in comprehending the complex concomitance of pain and sleep disorders.

REFERENCES
Figs 1 Forward Report Control of