ActiPatch Sleep Study

Chronic Pain and Sleep

A new hypothesis, which has attracted more and more attention, is that disturbances of sleep cause or modulate acute and chronic pain. Laboratory based sleep deprivation studies have also suggested that reductions in total sleep time are accompanied by increased sensitivity to noxious stimuli (secondary hyperalgesia) and by decrements in endogenous pain-inhibitory processes. This could also be a link between chronic pain and central sensitization (CS). In patients with osteoarthritis (OA), more than half experience pain during the night, resulting in sleep disruption, poor sleep quality, sleep fragmentation and frequent shifts between sleep stages. Recent studies have shown that sleep disruption can be a predictor of pain severity. Sleep disruption, therefore, could be associated with increased pain sensitivity and enhanced pain facilitation in addition to reduced pain inhibition in persons with chronic pain. Data has shown that severity of sleep disruption are associated with altered pain processing, and that sleep interventions for persons with knee OA-related pain might contribute to pain reductions.

In general people with insomnia and other sleep problems have increased sensitivity to pain. Sleep disruption appears to be associated with altered pain processing and central sensitization.

Results

N =149

Table 1. Age and gender of the study participants.

Age	PERCENT	Gender	Percent
18-24	0	Male	16
25-34	2	Female	84
35-44	19		
45-54	27		
55-64	27		
65 plus	26		
Prefer not to answer	0		

Table 2. Pain duration of the subjects recorded in the 7 day trial assessment.

Duration	PERCENT
0-6 months	7
6 m – 1 year	9
1-2 years	15
2-5 years	23

5-10 years	19
10-20 years	19
20 years plus	9

Table 3. Location of pain and use location of the trial device

	Pain Location %	Device Use
Back	61	58
Knee	23	15
Neck	15	9
Shoulder	17	13
Hip	19	9
Ankle	7	2
Foot	10	4
Elbow	3	0
Wrist	4	0
Leg	12	3
Hand	5	0
Other	5	3

Table 4. Pain Etiology

Etiology	Percent
Not sure	17
Accident	8.5
Ankylosing spondylitis	4.5
Cervical issues	3.5
CRPS	0.5
Disc issues	14.5
Fibromyalgia	13
Frozen shoulder	1.5
Ligament damage	1.5
Multiple Sclerosis	0
Neuropathy	4.5
Osteoarthritis	18.0
Osteoporosis	3.0
Rheumatoid arthritis	8.5
Sciatica	10.5
Sports injury	3.5

Surgery	3.5
Tendinitis	2.0
Trapped nerve	5.5
other	15.0

Pain Data/Sleep Data

Both pain and pain's impact on sleep were assessed on a 0-10 visual analogue scale (VAS), Table 5 shows the averages across the entire group.

Table 5. Baseline and post-trial VAS scores, VAS difference and percent difference.

	N = 149 Pain	N = 149 Sleep
Baseline VAS	8.29 ± 1.34	6.78 ± 3.14
Post-trial VAS	5.19 ± 2.87	4.36 ± 3.34
VAS Difference	3.10	2.42
Percent Improvement	37.4%	35.6%
P Value	< 0.001	< 0.001

Of the subjects 125 reported that their pain did interfere with their ability to sleep whereas 24 subjects indicated that it did not. Of those 125 subjects that indicated a sleep interference due to pain 76 (61%) reported that they improved their sleep with the use of the trial device. In Table 6 the pain and sleep scores of those who had improved sleep are shown, as well as the pain and sleep scores who didn't report improved sleep.

Table 6. VAS scores for the individuals who reported that their pain interfered with their sleep, data for those who had sleep improved (n= 76) with the trial device and those that reported no improvement (n = 49).

	N = 76 Improved sleep PAIN	N = 76 Improved sleep SLEEP
Baseline VAS	8.48 ± 1.32	7.81 ± 1.82
Post-trial VAS	3.81 ± 2.42	3.32 ± 2.44
VAS Difference	4.67	4.49
Percent Improvement	55%	57.5%

	N = 49 No Improved sleep PAIN	N = 49 No Improved sleep SLEEP
Baseline VAS	8.33 ± 1.20	7.76 ± 2.31
Post-trial VAS	7.67 ± 1.82	7.65 ± 2.28
VAS Difference	0.66	0.11
Percent Reduction	7.9%	1.4%

Table 7. Pain data for the (n = 24) subjects who reported that their pain didn't interfere with their sleep.

	N = 24 Pain
Baseline VAS	7.57 ± 1.47
Post-trial VAS	4.57 ± 2.69
VAS Difference	3.00
Percent Improvement	39.6%

Conclusion

For those that have sleep interference due to their pain, decreasing their pain scores is closely related to sleep improvement.