

PERIODIC LIMB MOVEMENTS – THE FREQUENCY, SEGMENTS OF SLEEP AND BODY MOVEMENTS OBSERVED IN A SUBURBAN SLEEP CENTER

Hooper RG, Moncrief SL

Scottsdale Sleep Center, Scottsdale, AZ

PURPOSE

Establish the frequency and patterns of Periodic Limb Movements (PLMs) seen in a suburban AASM accredited center.

Establish the movement associated with the PLMs recorded.

POPULATION

All Initial Diagnostic PSGs

- Full and Split Nights (460)
- Individuals > 17 yrs old
- Between Oct '08 & Oct '09
- Male 63.9%, Female 36.1%

Performed for AASM Guideline indications

METHODS

Observational series

Diagnostic PSG results reviewed

Periodic Limb Movements classified by Frequency (Index)*

- PLMI 0 - No PLMs
- PLMI < 15 - Mild
- PLMI 15-29 - Moderate
- PLMI > 29 - Severe

Segment of Polysomnogram

- First Third
- Middle Third
- Last Third

Body Movements Observed**

- None - 0
- One extremity - 1
- Two extremities - 2
- Three extremities - 3
- Four extremities - 4

SUMMARY - FREQUENCY

PLMs are commonly observed on diagnostic polysomnograms (PSGs)

PLMs occurrence and PLMI frequency were similar in both sexes.

PLMI frequency increases with age

PLMs can be observed in any portion of PSG

PLMI is a reflection of the duration of PLM episodes and the amount of total sleep.

PLMI does not accurately reflect the intensity of the PLM events.

RESULTS

PLMI - FREQUENCY

	Series	Males	Females
Total			
None	223(48%)	150(51%)	73(44%)
PLMs	237(52%)	143(49%)	94(56%)

PLMI frequency		Males	Females
Mild (<15)	150(63%)	87(61%)	63(67%)
Mod (15-29)	41(17%)	24(17%)	17(18%)
Severe (>29)	46(19%)	32(22%)	14(15%)

PLMI - FREQUENCY AND AGE

AGE	Total	PLMIs			
		None	Mild	Moderate	Severe
< 30	35	24	11	0	0
30-49	141	71	52	12	6
50-69	196	98	61	19	18
>70	88	31	26	10	21

SEGMENT OF PSG WHERE MOVEMENTS OBSERVED

Frequency	One Third	Two Thirds	Throughout
Mild (<15)	51.8%	28.2%	20.0%
Mod (15-29)	31.4%	25.7%	42.9%
Severe (>29)	4.9%	36.5%	58.5%

When only observed in one third of the study

First Third	Second	Final Third	Total
39(56%)	19(27%)	12(17%)	70

PLMI - FREQUENCY VERSUS INTENSITY

The PLMI for the duration of sleep while the PLMs are occurring is a more accurate measure of the PLM intensity than the PLMI for total sleep.

Example

PLMI = 22.4	PLMs/PLM sleep time = 98.2
PLMA = 1.2	PLMAs/PLM sleep time = 5.0

SUMMARY - MOVEMENTS

Movements as a result of PLMs can be dramatic.

Dramatic movements as a result of PLMs occur at all levels of PLMI.

Movements can vary significantly from PLM to PLM.

RESULTS

OBSERVED MOVEMENTS AND FREQUENCY

Movement Rating	PLMI Frequency(%)		
	Mild	Moderate	Severe
0	30.9	20.5	18.2
1	32.7	48.7	18.2
2	20.9	12.8	34.1
3 or 4	15.4	17.9	29.5

Significant movements were observed at all levels of PLMI.

Significant movements were seen with very mild frequency (PLMI < 5 per hr) 93 patients

PLMs rated 3 or 4
Frequency of PLMI < 5 = 20% (19/93)

OBSERVED MOVEMENTS - OBSERVATIONS

Our movement rating does not directly represent the strength of movements.

A rating of One could represent movement of toe, foot or leg, or a slow movement or a rapid kicking or jerking of the extremity.

High movement ratings were not always accompanied by an arousal or awakening.

Individual movements observed often varied from the overall rating.

Individual movements observed often vary in location.

Example: PLM Movement Max	= 4
PLM Movement Min	= 0
PLM Movement average	= 1.3

CONCLUSIONS

PLM scoring of polysomnograms should include:

A Body Movement Scoring system

A measurement of the duration of PLM episodes and the number recorded

A measurement of PLM intensity during the episodes of PLM activity

DISCUSSION

PLMI - Value as a measure of Limb Movements

Measures the PLMs for the total sleep recorded. The number of PLM episodes and their duration are reflected by the PLMI.

PLM intensity (number of PLMs during the period of sleep when they are occurring) is not measured by PLMI.

Potential sleep disruption is most likely related to the intensity of PLMs during an episode and the duration of PLM episodes.

Body Movements

Not considered in routine scoring of PLMs. Vary significantly independent of PLMIs.

Multiple extremity movements are seen at all levels of PLMIs using current scoring parameters.

PLM scoring should include:

A frequency scoring system that includes:

- The frequency of PLMs during the episodes that PLMs occur i.e. PLMs/PLM sleep time
- A measurement of the PLM episodes' duration and number

A Body Movement Scoring system that includes:

- The extremities that move
- The intensity of the movements
- The predominate movement score and frequency
- The maximum movement score and frequency

* Scored using AASM criteria

** Based upon predominate movements observed

