

New Apnea and Restlessness Indices added to ActionW

In the paper, “**Ambulatory Evaluation of Sleep Disturbance and Therapeutic Effects in Sleep Apnea Syndrome by Wrist Activity Monitoring**” by G. Aubert-Tulkens, C. Culee, K. Harmant-van Rijckevorsel, & D.O. Rodenstein.; (Am Rev Respir Dis 1987; 136: 851-856), the authors describe the usefulness of an Activity (Movement) Index and Fragmentation Index in diagnosing Sleep Apnea Syndrome (Sensitivity 89% and Specificity of 95% with respect to PSG-based diagnoses).

Ambulatory Monitoring, Inc. has recently added the following derived parameters to ActionW which may prove useful for screening SAS in populations where PSG recording may be difficult or impractical.

The paper defines the Activity (Movement) Index as the number of minutes with one or more movements (non-zero epochs) divided by the Time in Bed (in minutes) multiplied by 100. This parameter has always been available in ActionW and is known as Activity Index (“ACTx” is the heading in the statistics display).

The paper went on to examine the distribution of activity and immobility phases during Time in Bed (TiB). They observed that movement phases in SAS subjects occurred at close intervals, separated by immobility phases of much shorter duration compared to controls. They defined an index which, in ActionW we are calling “Short Burst Inactivity Index,” (SBIX, in the statistics display). SBIX is defined as the number of episodes of zero recorded activity lasting exactly one minute divided by the number of episodes of zero activity lasting any amount of time multiplied by 100.

In addition to these parameters which can be traced back to this 1987 paper on Sleep Apnea, we have included two other new parameters. Sleep Fragmentation Index (SFX) is a common metric used and understood by sleep specialists. It is defined as the number of awakenings (Wake Episodes, Wep) divided by the Total Sleep Time in minutes (Smin) multiplied by 100.

Another parameter which we feel might be illustrative of restlessness in sleep is Brief Wake Ratio (BWR). This is defined as the number of awakenings of one minute or less divided by the number of awakenings of any length (Wep).

So here's the line up of new AW2 reported results during sleep:

Sleep Fragmentation Index (SFX) = Number of Awakenings / TotalSleepTime (in Minutes) * 100.00

Brief Wake Ratio (BWR) = Brief Wakes (duration of 1 min or less) / Number of Awakenings (WakeEpisodes)

Short Burst Inactivity Index (SBIX) = Number of episodes of zero recorded activity lasting one minute / Number of episodes of zero recorded activity lasting any amount of time * 100.00