

# DOWNLOAD PDF DEVELOPMENT AND VALIDATION OF A COMPUTER-BASED SLEEP-SCORING ALGORITHM

## Chapter 1 : Development and validation of HRCT airway segmentation algorithms - CORE

*In summary, we have presented a sleep-scoring algorithm which allows the real-time scoring of sleep-wake state using a computer-based analysis of EEG and EMG data in 5-s epochs. The algorithm can be implemented with one, two or three steps, depending on the needs of the study.*

**Abstract Study Objectives and Design:** To partially overcome the disadvantages of manual RWA scoring, which is time consuming but essential for the accurate diagnosis of RBD, we aimed to validate software specifically developed and integrated with polysomnography for RWA detection against the gold standard of manual RWA quantification. Academic referral center sleep laboratory. Polysomnographic recordings of 20 patients with RBD and 60 healthy volunteers were analyzed. In contrast with computerized scoring alone, computerized scoring plus manual artifact correction median duration 5. The computer algorithm used here appears to be a promising tool for REM sleep behavior disorder detection in both research and clinical routine. A short check for plausibility of automatic detection should be a basic prerequisite for this and all other available computer algorithms. To overcome this major limitation, computer-assisted algorithms for the detection of RWA have been developed over the past several years, 10 – 14 but none of these software solutions has been integrated in existing PSG systems. This, however, would be essential for clinical routine. In addition, software solutions focused only on the chin, but not the limbs which was shown to be of importance for RBD evaluation. To emphasize the importance of artifact correction for any automatic detector, we provided both the uncorrected and the manually artifact corrected validation results. The assessment of normative values for REM-related electromyographic EMG activity for the differentiation between patients with RBD and controls was not within the scope of the current study. All healthy volunteers were selected from the Inns-bruck sleep laboratory normative sample. Approximately four subjects had to be screened to identify one willing and eligible subject fulfilling the strict inclusion and exclusion criteria. Because the goal of the project for which we originally recruited these healthy sleepers was the investigation of motor activity in physiological sleep, careful attention was paid to the presence of RBD or other movement disorders during sleep, which was assessed by expert interview. For further details see the full paper on motor activity in healthy sleep published by Frauscher et al. Bussestraat 17, Rumst, Belgium. This computer algorithm was individually tailored by the authors together with the software development department of the OSG company in several sessions for the detection of RWA based on the previous works of the SINBAR group. For symptomatic patients with RBD, the exclusion criterion was use of clonazepam or melatonin for RBD-specific treatment. All participants granted written informed consent prior to study participation. Video-PSG Video-PSG included electroencephalography F3, F4, C3, C4, O1, O2, M1, and M2 electrodes , electrooculography vertical and horizontal eye movements , electromyography EMG mental, both flexor digitorum superficialis muscles FDS , both anterior tibialis muscles , and cardiorespiratory recording [single channel electrocardiography, nasal airflow thermocouple , pneumoflow, tracheal microphone, thoracic and abdominal respiratory movements piezo , transcutaneous oxygen saturation]. Sleep was scored according to the AASM criteria. For phasic EMG activity, a default setting with a duration between 0. The background EMG was adaptively calculated over 15 sec. The intermovement distance is given with 0. In line with the manual quantification of REM sleep, 3-sec miniepochs were evaluated. The tonic activity of the mentalis muscle was evaluated in 1-sec timeframes over the entire night and divided into four categories ranging from low level to high level EMG activity. Manual artifact correction consisted of the exclusion of false positive epochs because of snoring artifacts, electrocardiographic artifacts, or EMG activity in the context of arousals. All data were tested for normal distribution using the Shapiro-Wilks test. Because data were not normally distributed, nonparametric statistics were applied. Spearman correlation coefficients were assessed to investigate correlations between manual and computerized quantification of REM-related EMG activity. A P value less than 0. RBD etiology was idiopathic in 10 cases 9 men, 1 woman and symptomatic in 10 cases 9

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men, 1 woman because of neurodegenerative disease. Five of the 10 subjects had probable Parkinson disease, three probable multiple system atrophy, one probable Lewy body dementia, and one patient had suspected neurodegenerative disease that was not further specified. Idiopathic RBD subjects had no neurological or psychiatric medication, whereas in the symptomatic RBD group, five patients were on antiparkinsonian medication: Two of the 10 subjects were treated with the selective serotonin reuptake inhibitor sertraline. One patient was taking the atypical neuroleptic olanzapine. The healthy volunteer sample consisted of 18 men and 42 women with a mean age of 58. None of these subjects had any central nervous system active medication. Table 1 provides the PSG characteristics of the two study samples. For this analysis, a total of 87, REM sleep 3-sec miniepochs mean number of analyzed REM sleep 3-sec miniepochs per subject:

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## Chapter 3 : Design and validation of a computer-based sleep-scoring algorithm | Read by QxMD

*Design and validation of a computer-based sleep-scoring algorithm Design and validation of a computer-based sleep-scoring algorithm Louis, Rhain P; Lee, James; Stephenson, Richard A computer-based sleep scoring algorithm was devised for the real time scoring of sleep-wake state in Wistar rats.*