

## Polysomnographic findings and cyclic alternating pattern analysis in children affected by primary monosymptomatic nocturnal enuresis (PMNE)

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**Objective:** Primary monosymptomatic nocturnal enuresis (PMNE) is a common problem in childhood worldwide, consisting in an “involuntary voiding of urine during the night, in the absence of congenital or acquired defects of the central nervous system or the urinary tract, in a child aged five years or over”. Presently the pathophysiogenetic mechanism seems not fully understood, and there is disagreement about the sleep quality of affected children.

Aim of study is assessing the sleep macrostructure and the NREM sleep instability (CAP analysis) among a sample of enuretic children.

**Methods:** 40 PMNE children (22 Males) (mean age 9,082; SD  $\pm$  2,28) underwent an overnight polysomnographic study and were compared with 52 healthy children overlapping for age and gender.

**Results:** PMNES children present a reduction in sleep duration parameters ( $p < 0.001$ ), and in REM% ( $p < 0.001$ ) and S1% ( $p = 0.01$ ) and an increased in SWS% ( $p = 0.005$ ) than controls (Table 1).

Among the CAP sleep parameters, the bedwetting group show differences in A1 and A2 representation (Table 2).

**Conclusion:** The present study could open a new window

in the management of PMNE, suggesting to consider it properly a neurologic disease in the next future. The Table 1 shows the differences among children affected by primary monosymptomatic nocturnal enuresis (PMNE) and control group in the following parameters: TIB, Time in bed; SPT, Sleep period time; TST, Total sleep time; SOL, Sleep onset latency; SS/h, Stage shifts per hour; AWN/h, Awakenings per hour; SE, Sleep efficiency; WASO, Wakefulness after sleep onset; S1 and S2, Sleep stages 1 and 2; SWS, Slow-wave sleep; REM, Rapid eye movement sleep; AHI, Apnea/Hypopnea Index; ODI, Oxygen Desaturation Index; PLM, Periodic Limb Movements.  $p$  values  $< 0.05$  were considered as significant. The Table 2 shows the mean differences among children affected by primary monosymptomatic nocturnal enuresis (PMNE) and control group in the following parameters: CAP refers to cyclic alternating pattern; CAP rate (percentage of total NREM sleep time occupied by CAP sequences); percentage and duration of each A phase subtype; A1 index (number of phases A1 per hour of NREM sleep, and of S1, S2 and SWS sleep stage); A2 index (number of phases A2 per hour of NREM sleep, and of S1, S2 and SWS sleep stage); A3 index (number of phases A3 per hour of NREM sleep, and of S1, S2 and SWS sleep stage); duration of B phases; number and duration of CAP sequences.  $p$  values  $< 0.05$  were considered as significant.



	PMSE (n=40)		Control (n=40)		Mean Walkway	
	Mean	SD	Mean	SD	t	p
TMR_min	446.744	41.711	394.911	33.110	2.919	<0.001
TPT_min	443.718	46.110	377.200	37.309	10.919	<0.001
TST_min	428.718	46.811	359.158	38.345	10.719	<0.001
LOC_min	11.431	11.144	21.588	17.828	580.9	0.049
TRT_min	148.818	47.289	158.428	39.707	899.9	0.013
SSA	3.094	2.791	4.739	3.449	490.9	0.013
ANNA	3.174	3.084	3.117	3.324	494.9	0.061
STN	37.824	8.856	36.914	7.209	1000.9	0.734
MASS-apt	7.811	8.139	4.311	4.111	1009.9	0.013
SI-apt	7.543	7.141	3.858	3.118	408.9	0.001
SI-apt	17.888	7.500	47.588	24.778	407.9	0.049
VR3-apt	17.831	8.959	31.184	8.449	748.9	0.004
VR3-apt	14.718	8.111	31.558	7.778	408.9	0.001
AM	0.974	0.700	0.251	0.211	507.9	0.018
OD	0.940	0.211	0.811	0.170	1079.9	0.040
MSWA	7.981	4.447	3.737	3.111	587.9	<0.001

	PMSE (n=40)		Control (n=40)		Mean Walkway	
	Mean	SD	Mean	SD	t	p-value
CAP_Score	38.940	34.526	34.108	8.401	121.000	0.001
CAP_Raw901	38.800	38.370	18.887	17.880	122.000	0.001
CAP_Raw902	38.900	34.866	27.627	18.800	124.000	<0.001
CAP_Raw903	38.700	27.289	47.203	13.881	1020.000	0.012
TRT_min_AON	11.380	11.240	16.749	15.719	149.000	0.019
TRT_min_AON	11.100	10.940	15.834	15.911	706.000	0.007
TRT_min_AON	8.700	8.908	7.827	7.000	151.000	0.041
SI_min_Aon	11.380	11.400	15.529	14.819	747.000	<0.001
SI_min_Aon	11.701	7.280	13.711	2.802	746.000	0.018
SI_min_Aon	10.000	8.011	18.000	8.078	707.000	0.018
SI_min	28.800	13.949	40.411	18.128	421.000	<0.001
SI_min	10.879	14.479	8.877	8.186	159.000	0.019
SI_min	7.000	8.071	8.619	3.804	146.000	0.111
R_min_Aon	28.981	4.080	22.781	4.843	154.000	0.017
CyA_min_Aon	74.100	8.204	29.000	4.800	411.000	<0.001
Seq_min_Aon	28.800	13.818	28.000	16.401	147.000	<0.001
TRT_min_Aon	11.000	8.248	16.987	8.970	746.000	<0.001

**Biography**

Michele Roccella is Associate Professor of Child Psychiatry at the Department of Psychology, Educational Science and Human Movement, University of Palermo, Italy . He graduated in Medicine and Surgery and Specialization in Child Psychiatry at the University of Palermo. He is currently Director of the School of Specialization in Child Neuropsychiatry at the University of Palermo. He was Medical Director of the level at the Territorial Service of Mental Health USL

3 of Catania, District of Palagonia. He is the author of over 450 publications on national and international journals and has been awarded several prizes. The study of impairment in neuropsychological functioning in patients with epilepsy syndromes-chromosome genetic and headache in childhood is one of its main areas of clinical interest and research.

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