Is Rolandic epilepsy benign? Syntactic, lexical, and reading difficulties in adolescents with Rolandic epilepsy

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INTRODUCTION

- Benign childhood epilepsy with centrotemporal spikes (BCECTS) or “Rolandic epilepsy” is the most common epilepsy in children.
- Onset is between ages 3 to 13 years, and seizures recede before the age of 16.
- The term "benign" refers to the fact that this syndrome recedes with age.
- However, it is not clear whether it is indeed benign in its effect on cognition and behavior: studies have shown various cognitive deficits among BCECTS children.
- In this study we asked whether this epilepsy is indeed benign in the language domain.
- We assessed: syntax, lexical retrieval, phonological STM, and reading abilities.

METHODS

1. **Participants**: 18 Children with BCECTS, aged 9-18,
   9 girls.
2. Our battery included 13 tests assessing: Syntax (A-bar movement and pronouns), Lexical Retrieval, Phonological STM, and word level Reading.
3. Individual performance on each structure and test was compared with a normative healthy control group using Crawford and Howell’s (1998) t-test.

GENERAL RESULTS

Participant	Syntactic Movement	Pronouns	Word level reading	Lexical Retrieval	pSTM
Mnm4				Impaired	
Gzm4					
Naf4	Impaired	Impaired		Impaired	
Gbf5	Impaired		Impaired	Impaired	Impaired
Nef5	Impaired		Impaired		Impaired
Shaaf6	Impaired		Impaired		Impaired
Shiaf6			Impaired	Impaired	Impaired
Iam6	Impaired		Impaired	Impaired	
Lam6				Impaired	
Ysf6	Impaired		Impaired	Impaired	Impaired
Lsf7	Impaired	Impaired	Impaired	Impaired	Impaired
Dbm6	Impaired		Impaired	Impaired	Impaired
Zsf9					Impaired
Rhm9	Impaired	Impaired	Impaired	Impaired	Impaired
Azm9	Impaired	Impaired	Impaired	Impaired	Impaired
Mgf11	Impaired	Impaired			Impaired
Igm12	Impaired		Impaired	Impaired	
Nbm12	Impaired	Impaired	Impaired	Impaired	

SYNTAX – TESTS AND RESULTS

Tests of syntactic movement:

- Sentence-Picture matching task, 66 items.
- “Adif” - Production of Subject and Object RCs, 20 sentences.
- ”Petel” - Sentence repetition, including sentences with and without syntactic movement and embedding, 70 sentences.
- “Meguvana” – Sentence reading and paraphrasing, 20 items.

Tests of direct object and reflexive pronouns

- Syntactic islands– pronoun elicitation task, 20 sentences.
- Sentence-picture matching task – comprehension

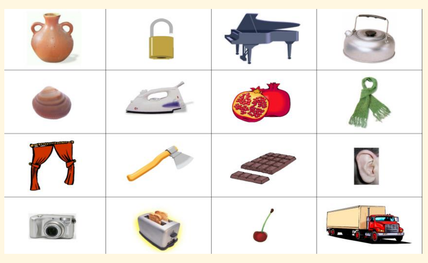
RESULTS SYNTACTIC MOVEMENT

- 13/18 participants had a syntactic movement deficit: They performed below age-matched controls on at least 2 syntactic tests.
- These participants did not have a general problem in constructing the syntactic tree: they succeeded in tests that do not involve an intervening lexically restricted DP (repetition of embedded clauses, production of subject RCs)

Participant	Syntactic movement Deficit?	Comprehension - OR sentences	Comprehension - OR sentences with a RP	OR elicitation	OR paraphrasing	Sentence Repetition – OR and topicalization
Mnm4	No					
Gzm4	No					
Naf4	Yes					
Gbf5	Yes					
Nef5	Yes					
Shaaf6	Yes					-
Shiaf6	No					-
Iam6	Yes					
Lam6	No					-
Ysf6	Yes					
Lsf7	Yes					
Dbm6	Yes					
Zsf9	No					
Rhm9	Yes					-
Azm9	Yes					
Mgf11	Yes					
Igm12	Yes					
Nbm12	Yes					

RESULTS PRONOUNS

- 6/18 participants had a pronoun deficit: They performed below age matched controls on at least 2 pronoun tests, involving both production and comprehension.
- The deficit results from a specific deficit in binding, and not a general problem in the construction of the syntactic tree.



Picture set used in the naming test

Participant	Elicitation: Direct object pronoun elicitation	Elicitation: Reflexive pronoun elicitation	Picture Selection: Embedded sentences with a DOP	Picture Selection: Conjoined sentences with a DOP	Picture Selection: Sentences with a reflexive pronoun
Mnm4	0	0	12.5%	0%	0%
Gzm4	2	0	0%	0%	0%
Naf4	2	0	12.5%	0%	12.5%
Gbf5	0	0	45%		0%
Nef5	0	0	12.5%	0%	0%
Shaaf6	1	0	10%		0%
Shiaf6	0	0	5%		0%
Iam6	0	0	0%	0%	0%
Lam6	0	0	0%		0%
Ysf6	0	0	12.5%	25%	0%
Lsf7	0	1*	37.5%	0%	0%
Dbm6	0	0	0%	0%	0%
Zsf9	3	0	0%	12.5%	0%
Rhm9	2	0	12.5%	25%	0%
Azm9	2	0	12.5%	12.5%	0%
Mgf11	3	0	12.5%	0%	12.5%
Igm12	3	0	0%	12.5%	0%
Nbm12	8	1	12.5%	25%	0%

READING, STM, AND LEXICAL TESTS (Number of items)

Reading aloud

- ”Tiltan” Screening –single words, non words and word pairs. (241)
- Migratable words – sensitive to LPD (120)
- Word pairs – sensitive to attentional dyslexia (64)
- Potentiophonic words – sensitive to surface dyslexia (78)
- Non words – sensitive to vowel-letter dyslexia (60)

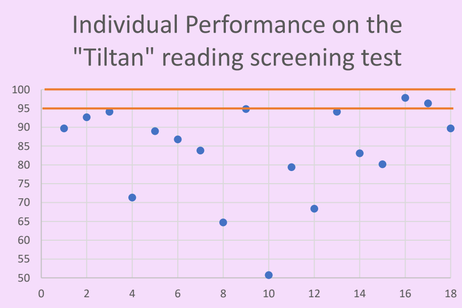
Phonological short term memory

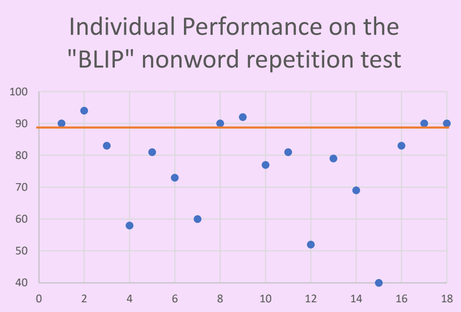
- ”BLIP” – non word repetition (48)
- “FriGvi” – word span tests: Basic, long, nonword and word matching spans.

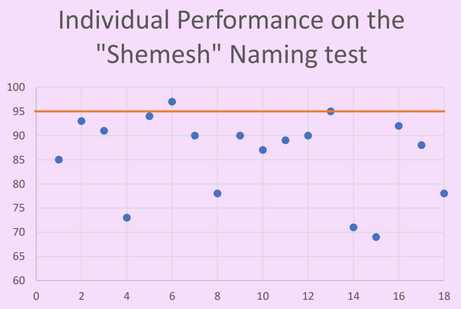
Lexical Retrieval

- ”Shemesh” - picture naming test (100)

Picture set used in the sentence-picture matching task







DISCUSSION

- All but two of the children and adolescents with BCECTS have impaired language and reading abilities. The majority have a syntactic deficit specific to wh-movement. Reading deficits were diverse and included many types of dyslexia.
- These findings are important at the clinical level, as they emphasize the importance of proper language and reading assessment among these children and indicate that it is necessary to treat this epilepsy because it is, after all, not benign.

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