

## Effective Alalia Rehabilitation Using Translingual Neurostimulation (TLNS): A Pilot Controlled Study

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### INTRODUCTION

Speech and language disorders often involve a **combination of motor speech disorders**, resulting in irregular muscle tone, movement, and motor skills (dysarthria, apraxia) and language disorders such as expressive language deficits.

These conditions are caused by neuronal damage to either the peripheral or central nervous system, which can lead to severe impairment in activities of daily living. **Most speech disorder symptoms are difficult to cure or improve.**

However, recent research has shown that combining Translingual Neurostimulation (TLNS) and modern speech therapy techniques can be **highly effective in rehabilitating individuals with speech and language disorders.**

### STUDY

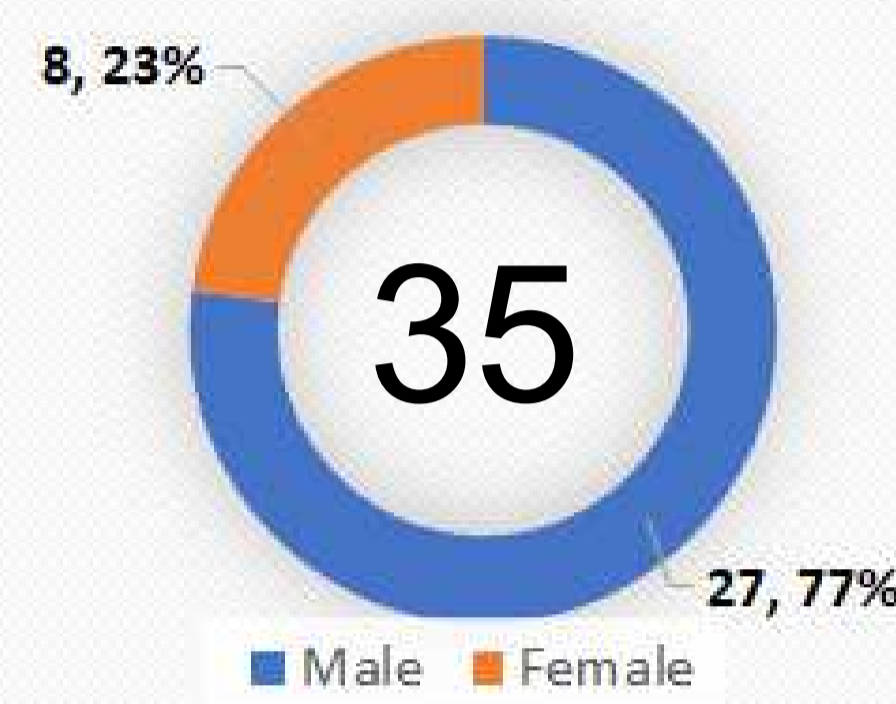
The present investigation pertains to children clinically diagnosed with **dysarthria** (ICD-10, F80.1) and **expressive language deficit** (ICD\_10, R47).

Sixty-five children, ranging from **2.7 to 10.2** years old, were evaluated before and after receiving a corrective course.

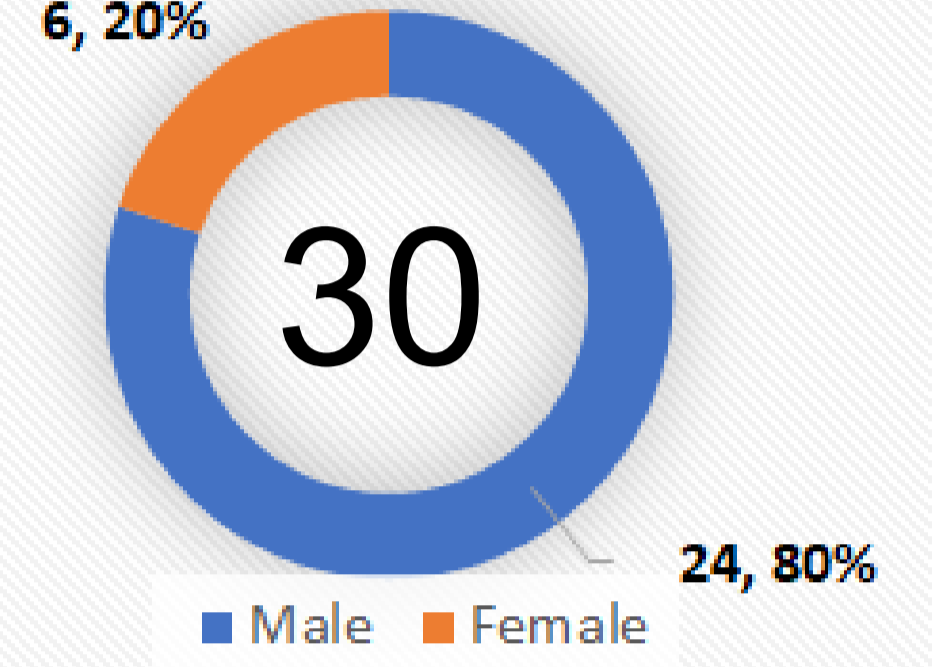
The children were divided into two groups, one consisting of 35 participants who underwent an active intervention and the other comprising 30 individuals who were assigned to the control group.

The mean age of the former and latter groups was **4.4 (SD=1.7)** and **4.4 (SD=1.4)** years, respectively.

### Active Group (TLNS)

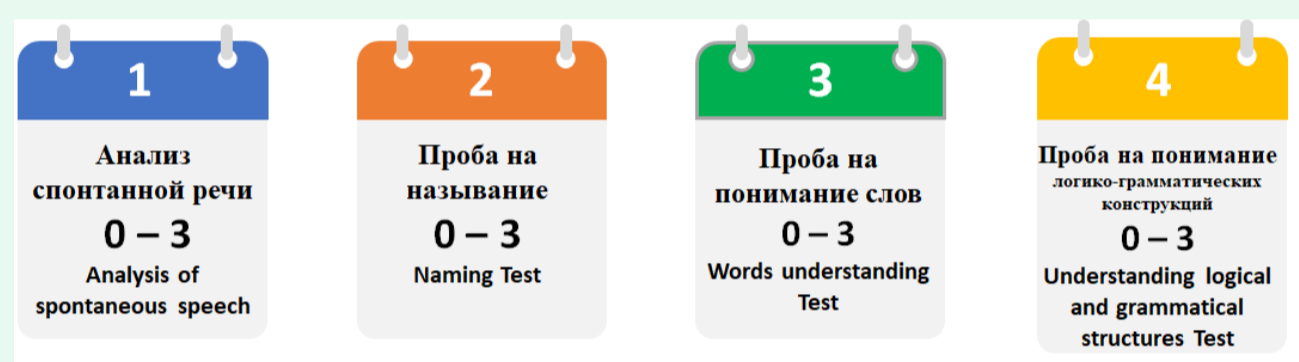


### Control group



### ASSESSMENT and SCORING

#### GLOZMAN Scale (0(best score) -12)



Less is better; the ideal score = 0

#### NISCHEVA Scale, 0 – 30 (best score)

1. Состояние фонематического восприятия / State of phonemic perception, 0 - 3
2. Состояние фонематического анализа и синтеза / State of phonemic analysis and synthesis, 0 - 3
3. Звукослоговая структура слов / Sound-syllabic structure of words, 0 - 3
4. Исследование пассивного словаря / Passive Vocabulary Research, 0 - 3
5. Понимание различных форм словосочетания / Understanding different forms of inflection, 0 - 3
6. Понимание отдельных предложений и связанной речи / Comprehension of individual sentences and connected speech, 0 - 3
7. Общие характеристики экспрессивной речи / General characteristics of expressive speech, 0 - 3
8. Состояние активного словаря (номинативного, предикативного) / The state of the active dictionary (nominative, predicative), 0 - 3
9. Состояние грамматического строя речи / The state of the grammatical structure of speech, 0 - 3
10. Состояние связанной речи / The state of coherent speech, 0 - 3

### TREATMENT

- VR neurofeedback "Nirvana", 7/week
- TDCS, 7/week
- Fotochrome therapy, 5/week
- Tsubotherapy 3/week
- Logopedic massage 7/week

### TLNS

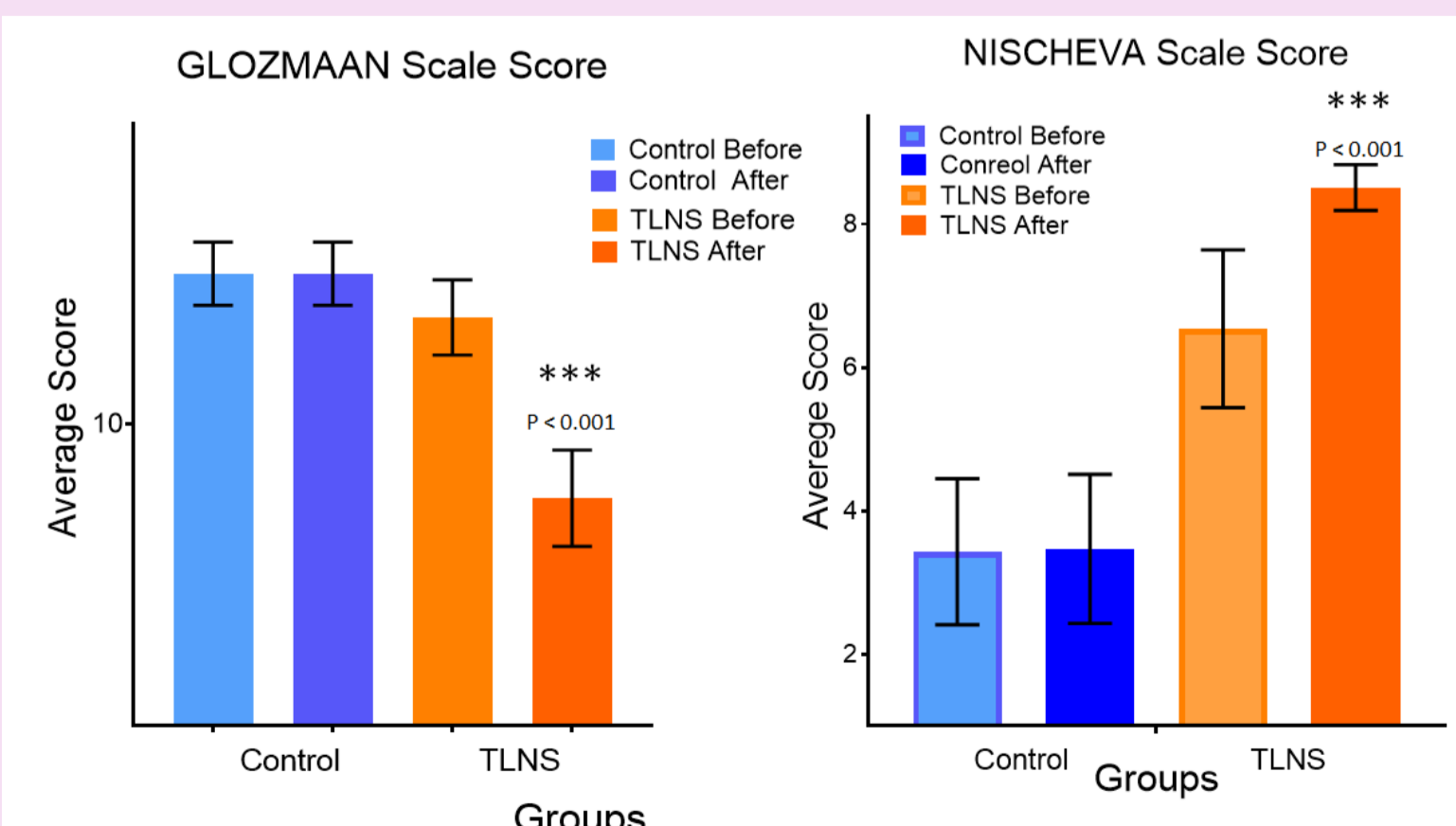
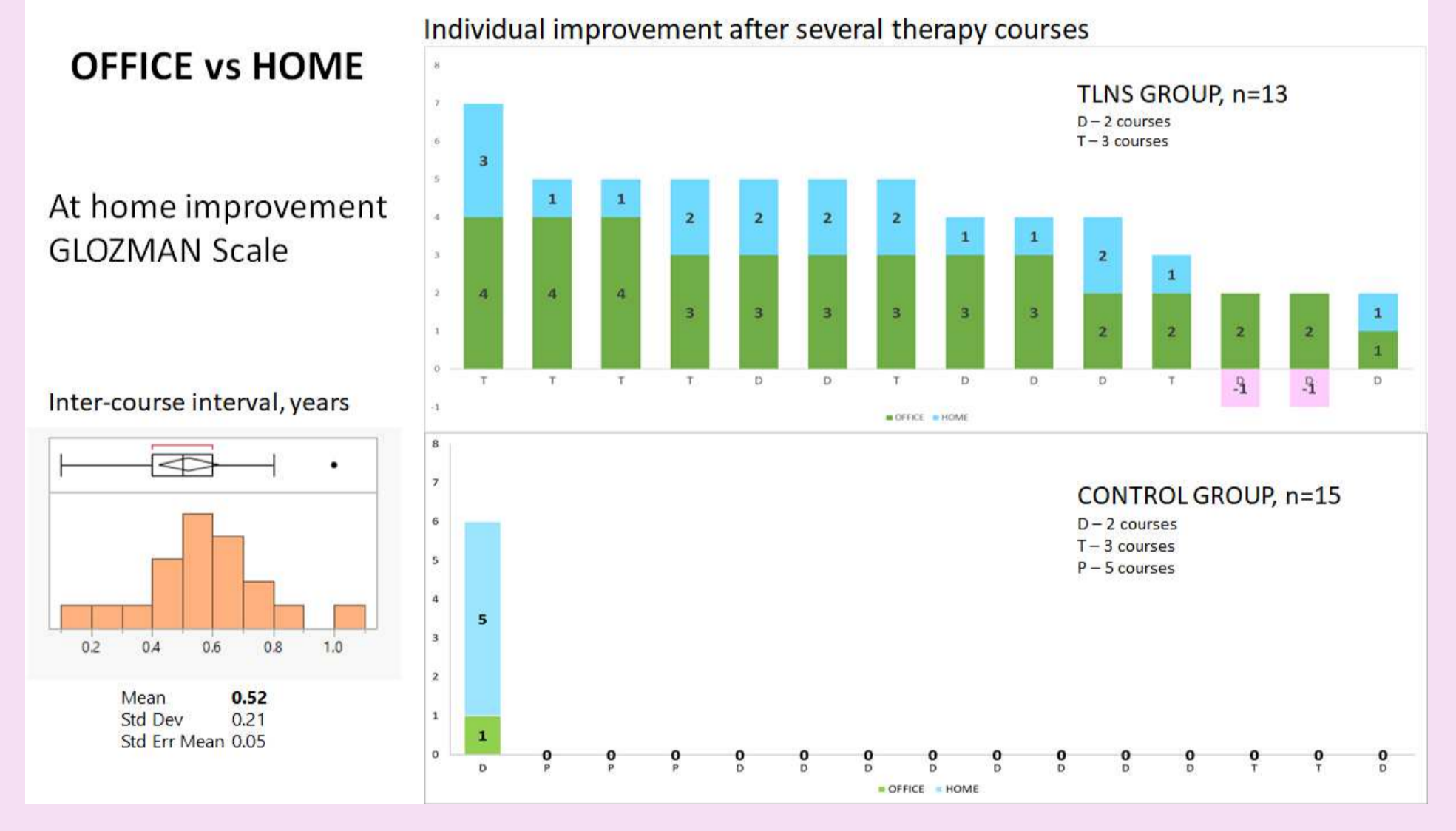
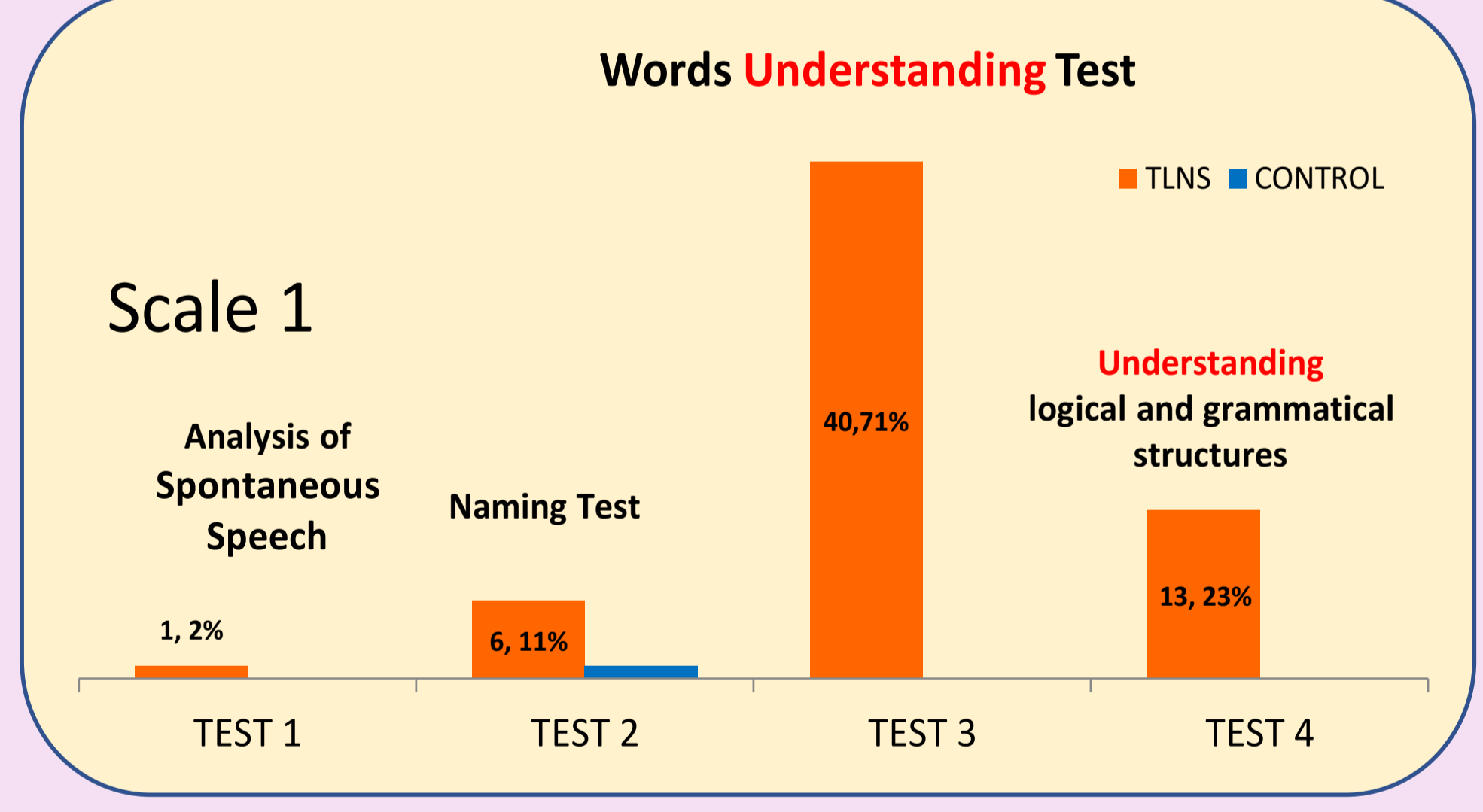
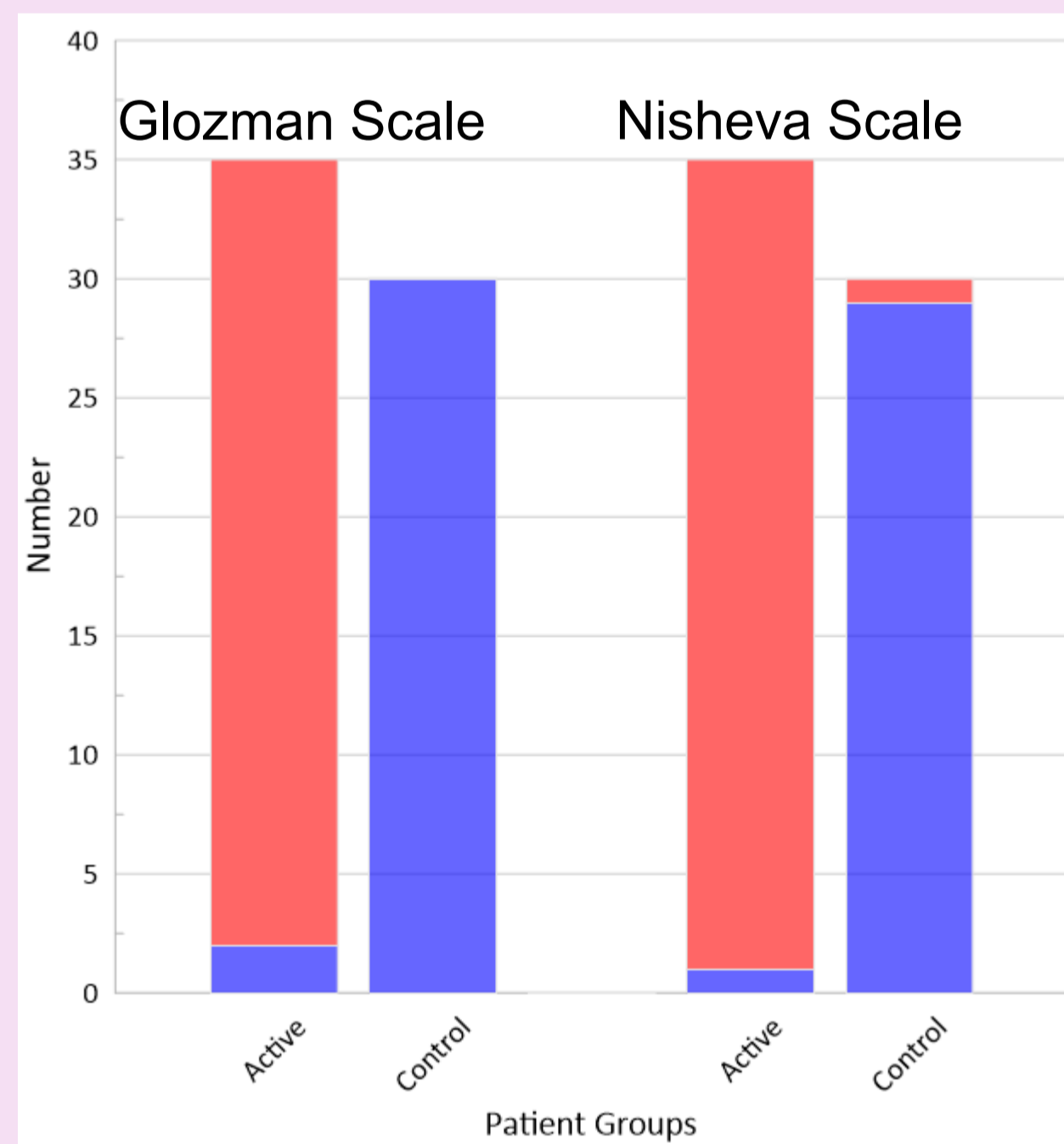
**27 000 000 impulses by At least ~ 22 000 fibers**

**PRIMARY TARGETS:** Trigeminal nuclei, Mesencephalic Sensory Spinal, Cochlear nuclei (ventral and dorsal), Solitary nucleus, Cuneate nucleus, Ventral Cerebellum, Spinal cord C2 - C3

### RESULTS

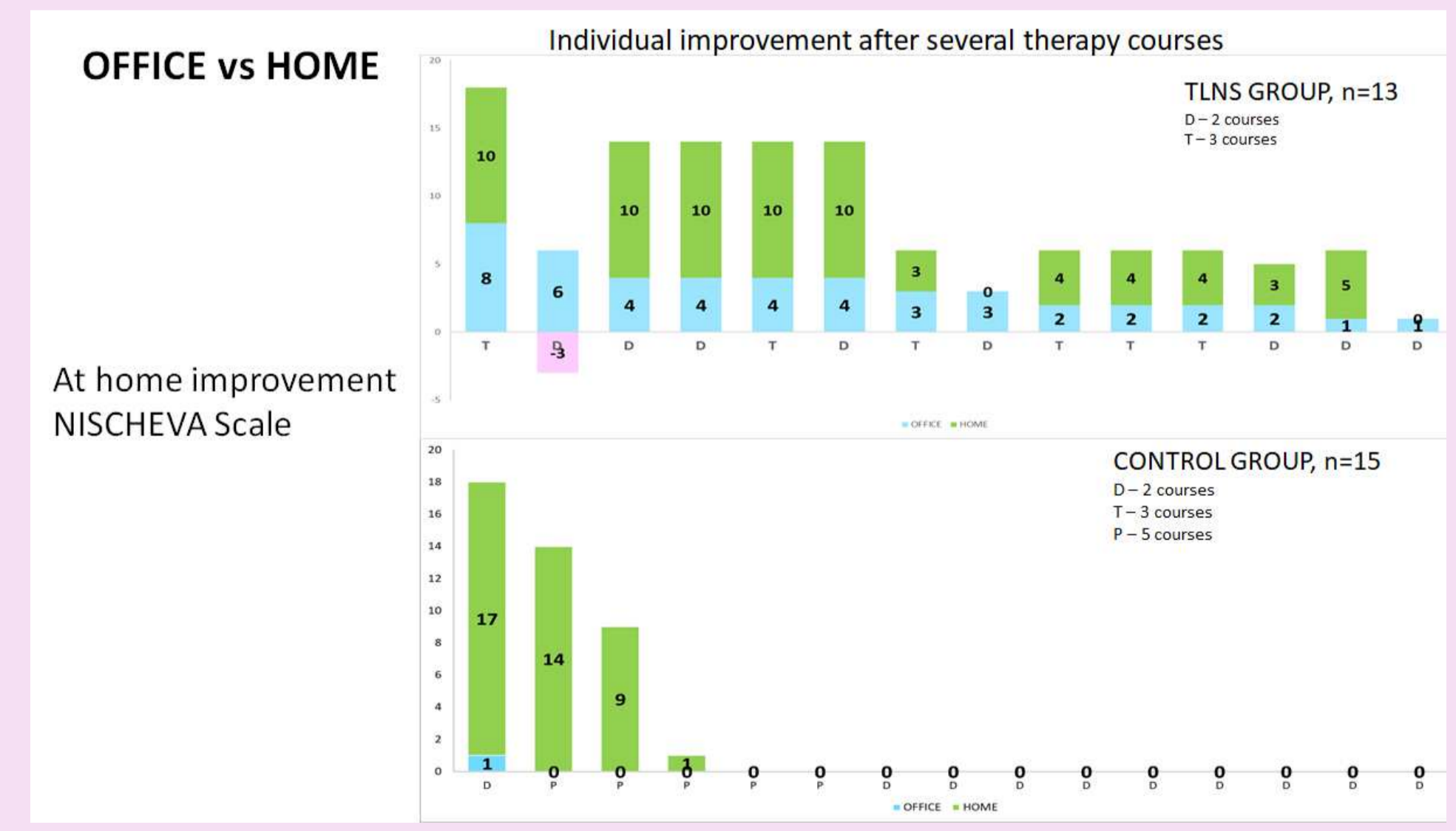
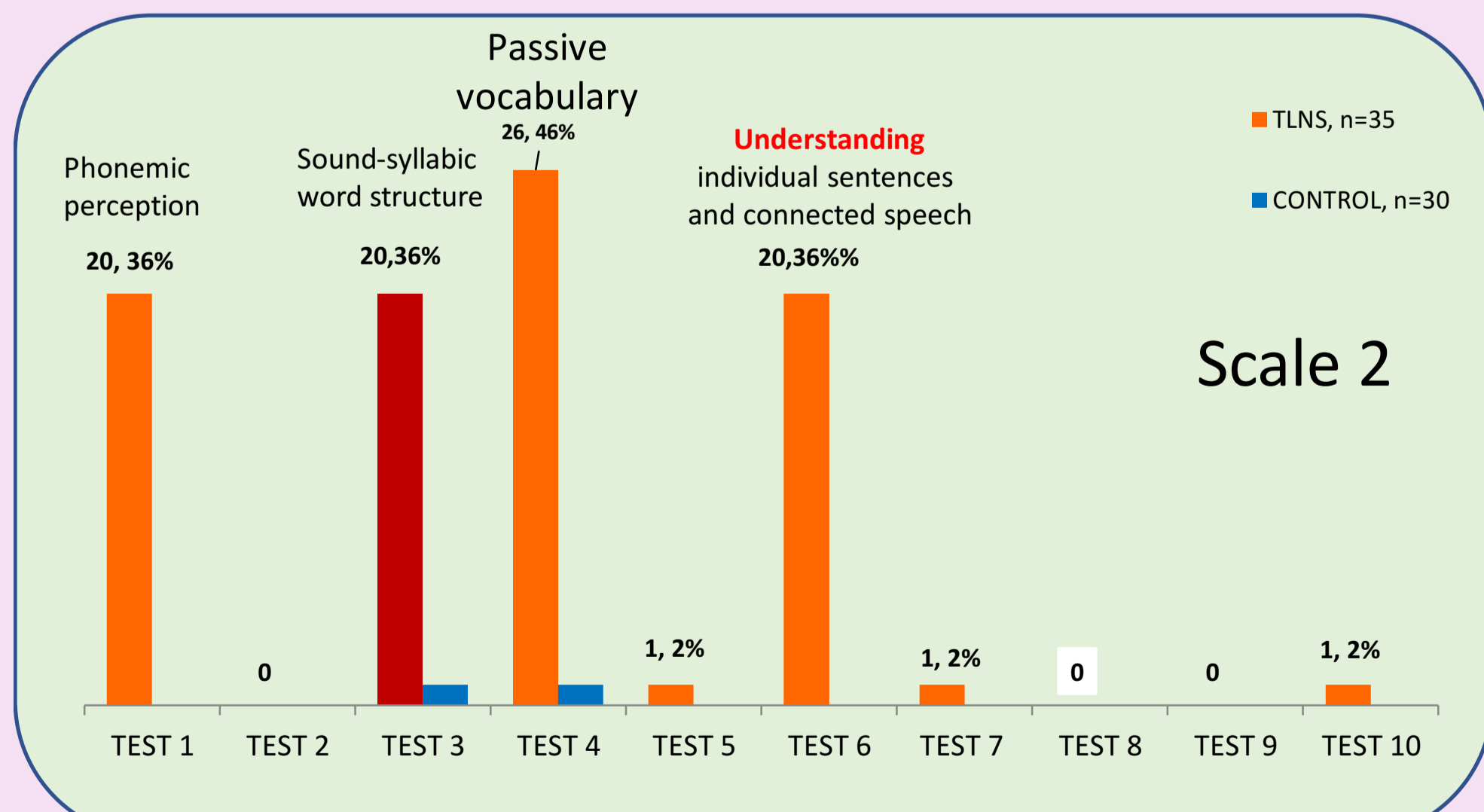
#### Selective Improvement

#### Delayed Improvement



Control - **100% NO response**  
TLNS group - **94% improve**

Control, 1/30 - **97% NO response**  
TLNS group, 33/35 - **94% improve**



### CONCLUSION

Integrating translingual neurostimulation and speech therapy is suitable for enhancing the recuperation of individuals with speech and language disorders.

The improvement in dysarthria and expressive language achieved through this approach can persist for 3-6 months without additional therapy sessions.

It can be gradually accumulated in subsequent speech therapy programs.



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