

Introduction

- The tongue plays a key role in safe and efficient bolus propulsion during swallowing with reduced pressure generation capacity noted to represent a risk factor for impairments in swallowing safety and efficiency¹
- Despite the high prevalence of impaired swallowing safety and efficiency in Amyotrophic Lateral Sclerosis (ALS) and Parkinson Disease (PD) tongue pressure generation capacity profiles are unknown.

Objective

- Aim:** To profile and compare lingual pressure generation capacity in patients with ALS (“PwALS”), patients with PD (“PwPD”), and healthy adults.
- Hypothesis:** Both patient cohorts would show reduced lingual pressure generation capacity compared to healthy controls, with the greatest reductions expected in the ALS cohort.

Participants

Table 1. Demographics of the healthy control, ALS, and PD cohorts

	Healthy controls	PwALS	PwPD
Number of participants	20	17	20
Median age (IQR)	68 (62-82)	71 (50-72)	71 (55-87)
Sex (male)	14	10	16
Mean time since initial onset (months)	N/A	37 (5 – 96)	64 (14 – 230)
Mean Hoehn and Yahr Scale score	N/A	N/A	2
Mean ALS Functional Rating Scale - Revised	N/A	3	N/A

Methods

- Measures of maximum anterior isometric pressure (MAIP) and regular effort saliva swallows (RESS) were used to quantify tongue strength and lingual functional reserve (LFR)²
- Participants performed 3 repetitions of MAIP and RESS tasks, with pressure measured using the Iowa Oral Performance Instrument (IOPI). Rest was provided between task repetitions.
- Univariate analyses of variance were performed, with a between-groups factor of cohort, alpha set at 0.05, and post-hoc Sidak tests for pairwise comparisons.



Results

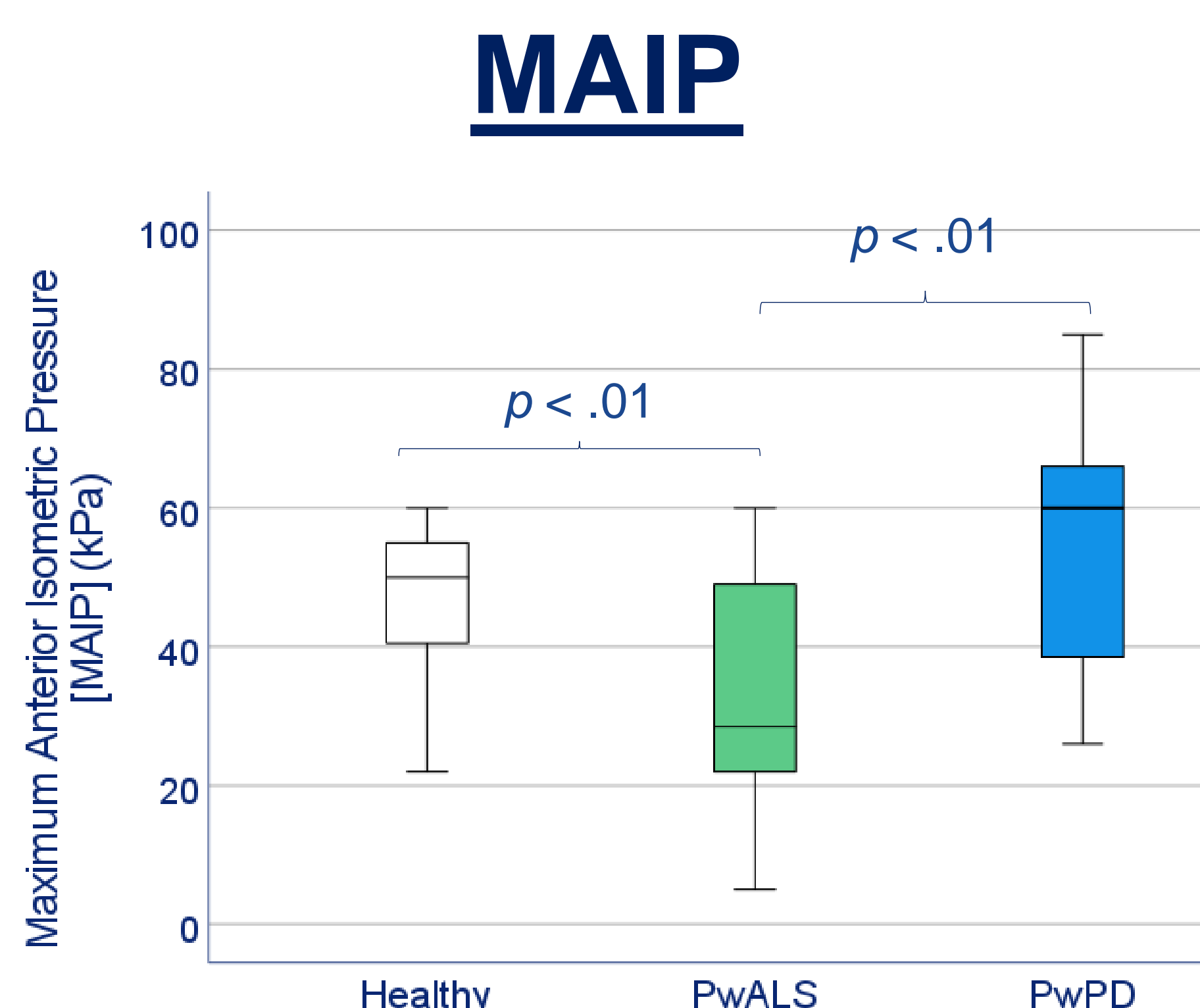


Figure 1. MAIP values by cohort. MAIPs were significantly lower in the PwALS.

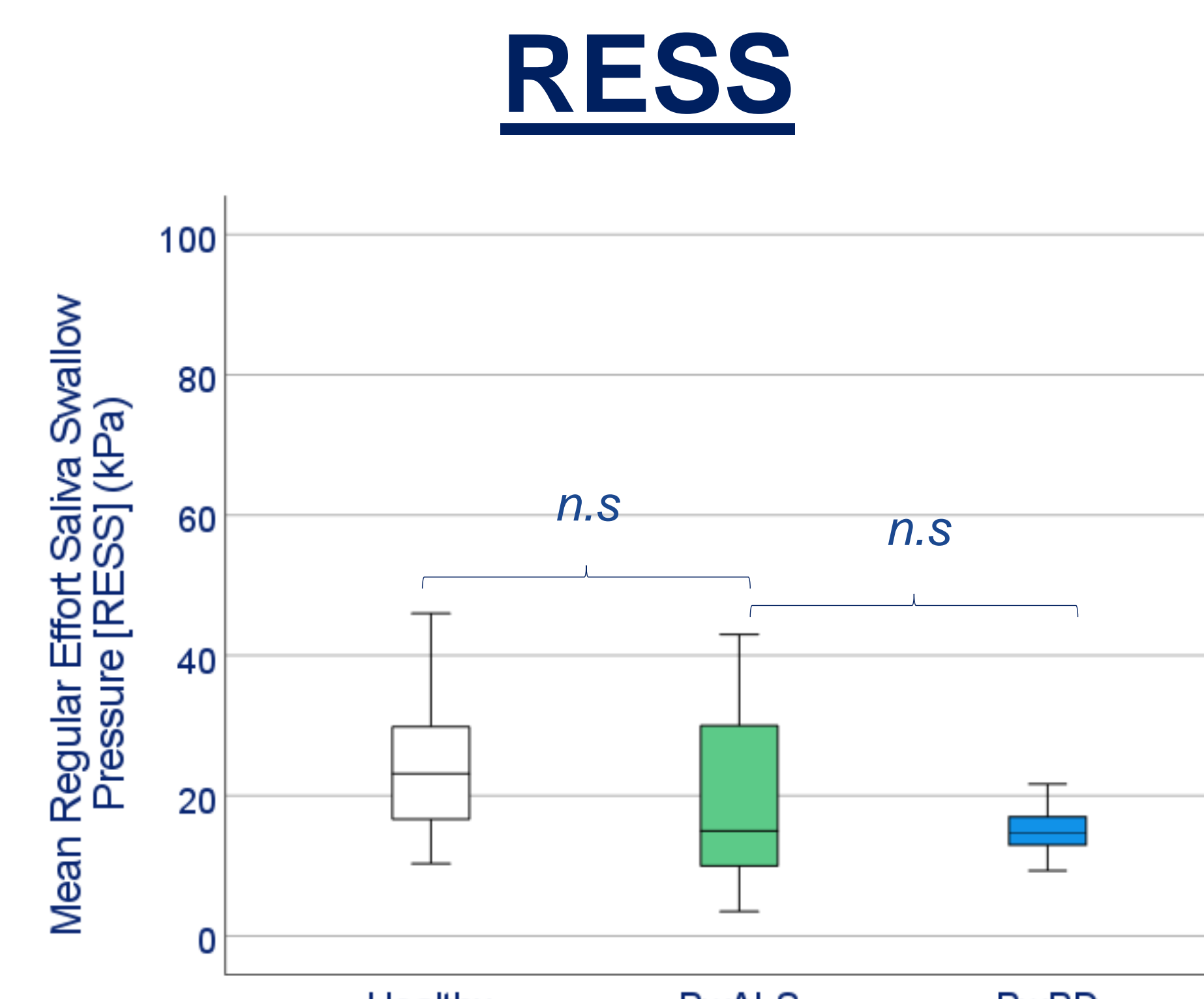


Figure 2. RESS values by cohort. RESS pressures did not differ across the three cohorts.

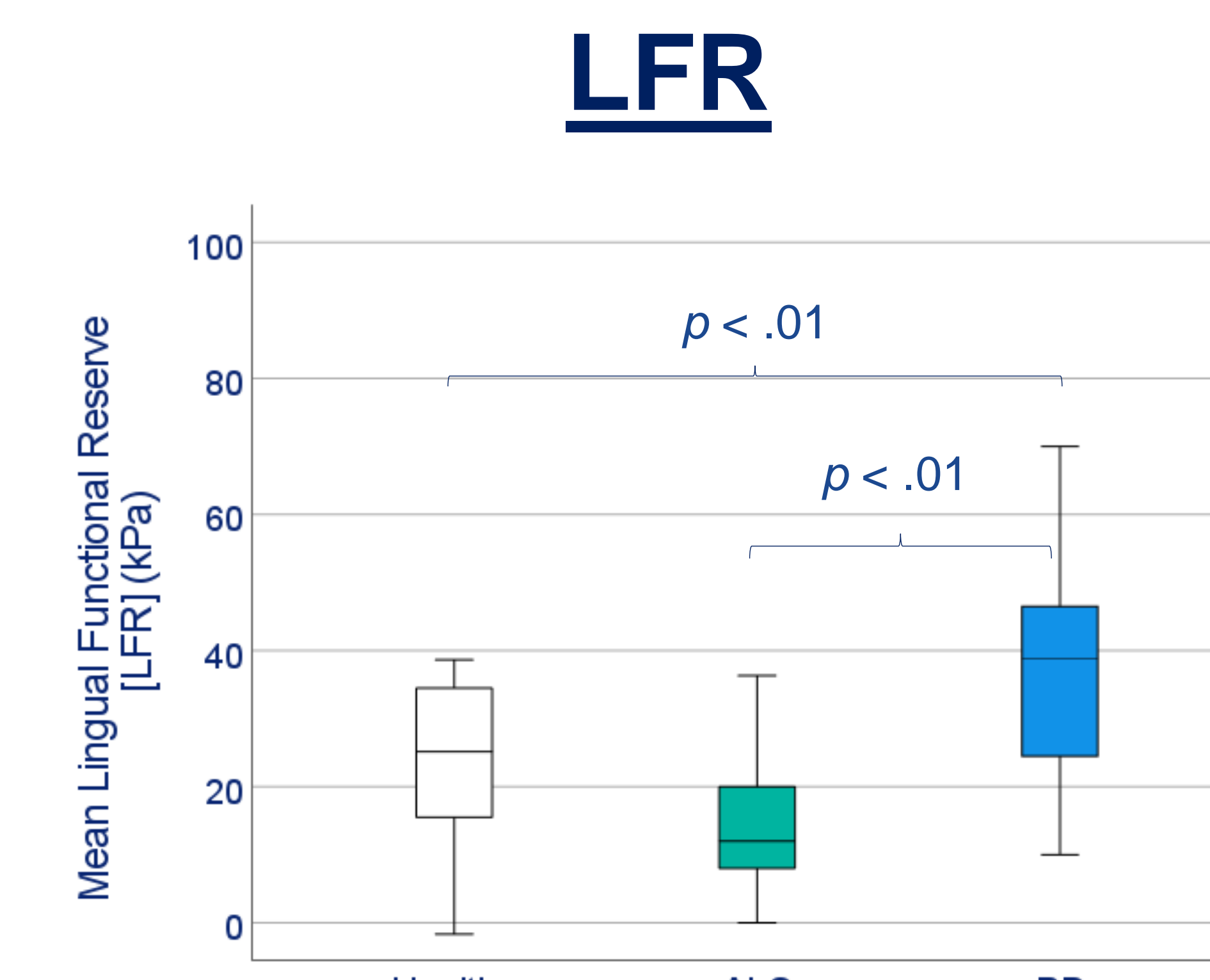


Figure 3. Mean LFR by cohort. LFR was significantly larger in the PwPD.

Conclusions

- Compared to age-matched healthy controls, lingual pressure generation capacity was reduced in people with ALS, but not in those with Parkinson Disease.
- Both patient cohorts displayed preservation of lingual pressure during regular effort saliva swallows.
- Future studies exploring longitudinal changes in tongue pressure generation on isometric and saliva swallowing tasks will be needed to determine whether tongue pressure measures serve as biomarkers of swallowing impairment in ALS and Parkinson Disease.

References:

- Nicosia, M. A., Hind, J. A., Roecker, E. B., Carnes, M., Doyle, J., Dengel, G. A., & Robbins, J. (2000). Age effects on the temporal evolution of isometric and swallowing pressure. The Journals of Gerontology Series A: Biological Sciences and Medical Sciences, 55(11), M634-M640.
- Steele, C. M. (2013). Optimal approaches for measuring tongue-pressure functional reserve. Journal of Aging Research, 2013.