Reproducibility of 3D Vascular Ultrasound for the Detection and Quantification of Early atherosclerosis: a FAMILIA substudy

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AHA SFRN Funded Research

INTRODUCTION

3DVUS offers promise for cardiovascular risk stratification in general population. However, its reproducibility in early stages of atherosclerosis has not been well stablished.

OBJECTIVES

To determine 3DVUS agreement and reproducibility for plaque detection and focal atherosclerosis burden quantification in carotid and ileofemoral territories.

METHODS

A total of 772 vascular territories were studied in 193 adults recruited in the FAMILIA study from 15 Head Start preschools in Harlem (New York).

- Vascular Plaque Quantification tool (QLAB)
- Two independent observers
- Kappa coefficients to assess the interobserver and intraobserver agreement for plaque detection.
- Intraclass correlation coefficient (ICC) and Bland-Altmant plots to assess the interobserver and intraobserver reproducibility for the analyses of focal atherosclerosis disease burden (plaque volume quantification)
  - Plaque-positive participants (n = 47)

RESULTS

- Mean age was 37.8 ± 11.4 years, 85% female, 64% Hispanic/Latino, 26% Non-Hispanic Black.
- Overall prevalence of subclinical atherosclerosis was 8.8 %.

	All territories	Carotid	Femoral
Plaque detection			
Interobserver Kappa (Obs.1 vs Obs.2)	0.89 (0.81-0.98)	0.92 (0.84-1.00)	0.82 (0.62-1.00)
Intraobserver Kappa (Obs.1 & Obs.2)	0.93 (0.86-1.00)	0.90 (0.80-1.00)	1.00 (1.00-1.00)
Plaque volume quantification			
Interobserver ICC (Obs.1 vs Obs.2)	0.89 (0.80-0.94)	0.88 (0.79-0.93)	0.85 (0.73-0.92)
Intraobserver ICC (Obs.1 & Obs.2)	0.88 (0.78-0.93)	0.85 (0.73-0.91)	0.87 (0.77-0.93)

Interobserver and intraobserver agreement was good for the detection of plaque and for focal disease burden quantification

Interobserver

Bland-Altman Agreement

Intraobserver

Bland-Altman Agreement
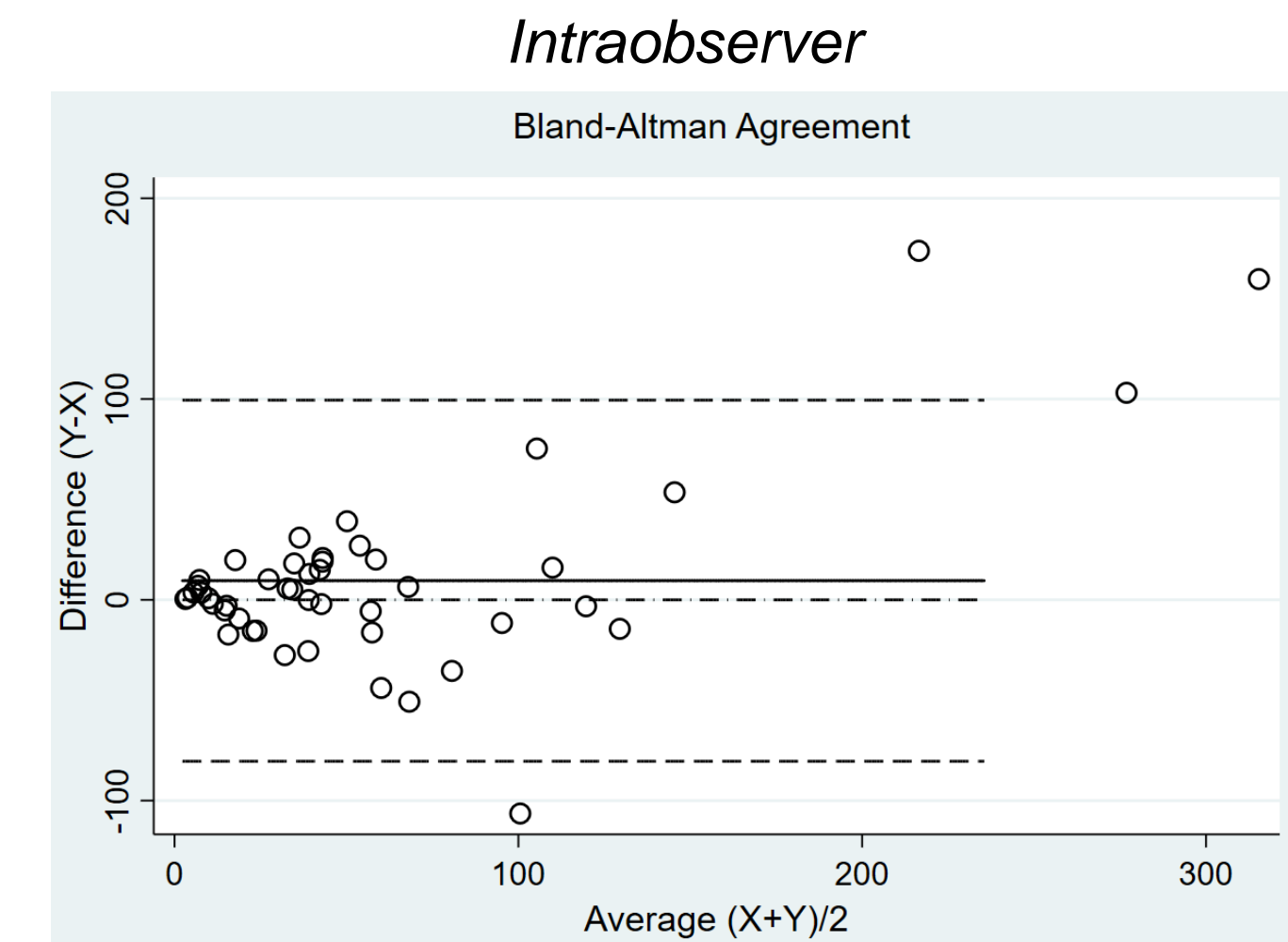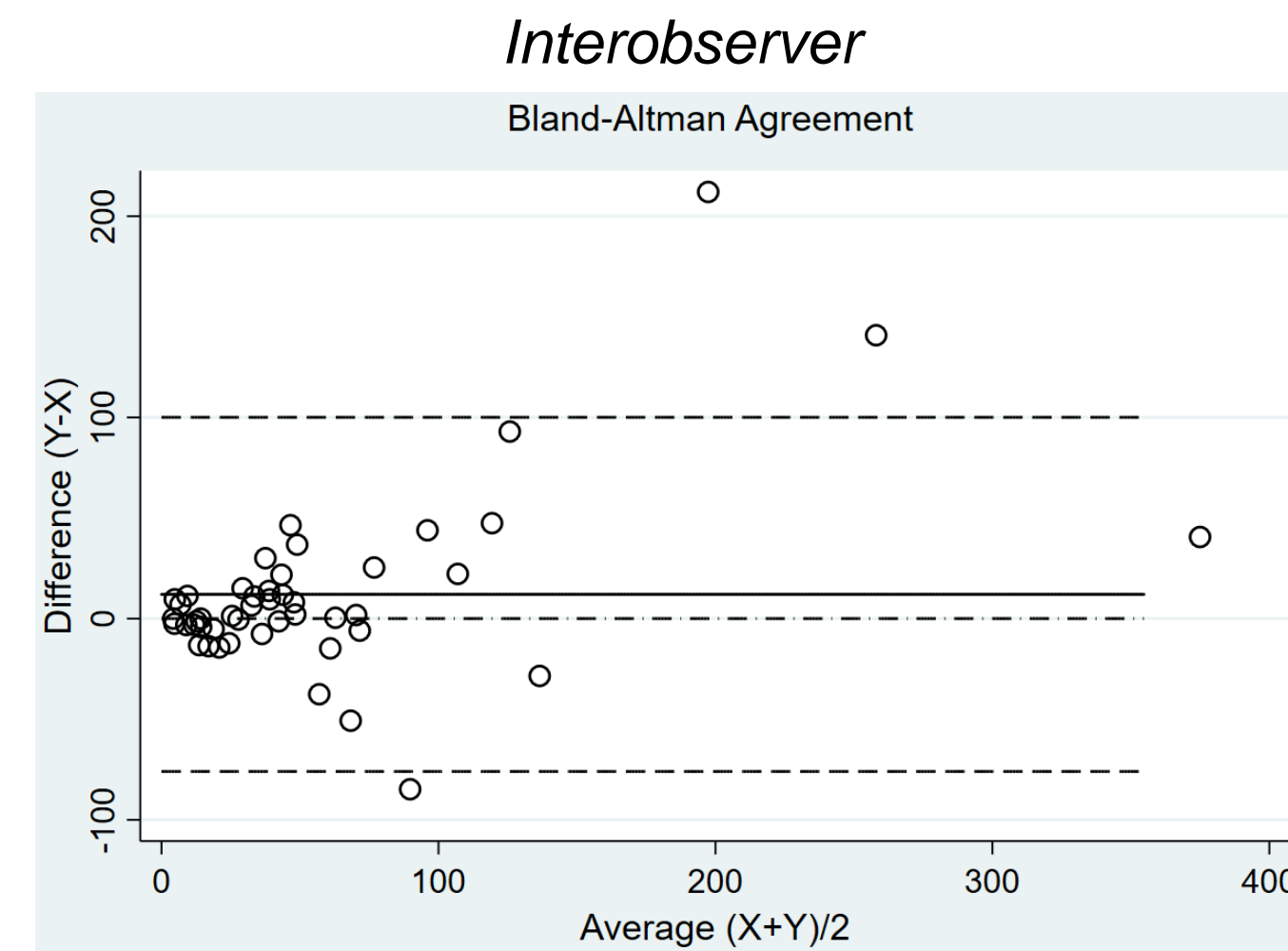
No significant interobserver or intraobserver bias was detected in Bland-Altman plots

CONCLUSIONS

- 3DVUS shows good interobserver and intraobserver agreement, and good reproducibility, for the detection and quantification of focal disease in early stages of atherosclerosis.
- 3DVUS could be used as a tool for subclinical atherosclerosis screening and for promoting healthy habits in the general population.