



Utilization Of An Infrared 3D Scanner For The Assessment Of Breast Cancer Related Lymphedema

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INTRODUCTION

- Breast cancer related lymphedema (BCRL) is a progressive and debilitating disease affecting 20–44% of patients undergoing axillary lymph node dissections (ALND). Surveillance of BCRL includes circumferential limb measurements which can be clinically time consuming and provider technique dependent

OBJECTIVES

- To assess the accuracy of an infrared 3D scanner to obtain limb volume measurements

RESULTS

- 53 patients
- Mean volume percentage difference for the 3D scanner was 11.7±16.0 compared to 9.8±15.0 (p=0.04) for the physical measurement
- Volume percentage difference between the 3D scanner and physical measurements were highly correlated (0.91, p<0.01)
- Average difference between the two measurements was 1.86 with a 95% confidence interval (-14.405 and 10.684)

DISCUSSION

- P-values of both total volume percent difference and circumferential differences were > 0.05, indicating no difference between the measurements of the two methods.

METHODS

- Prospective cohort study
- Limb volumes were obtained with physical measurements and infrared 3D scanner in our multidisciplinary lymphedema clinics between June and August 2023
- The scanner used was the LymphaTech 3D Imaging System (LymphaTech, Atlanta, GA)
- Volume percentage difference = Limb volume with ALND –unaffected limb volume
- Paired t-test, linear regression, and correlation analyses were performed using R version 4.2.1

	Tape Measurement (Mean ± SD)	3D Scanner (Mean ± SD)	Difference (95% CI)	P-value
Percent difference in total volume	9.88 ± 15.21	12.14 ± 16.38	-2.60 (-5.34 – 0.14)	0.0614
Circumference difference, 4cm	0.30 ± 1.14	-0.25 ± 2.25	0.47 (-0.27-1.22)	0.2012
Circumference difference, 8cm	0.37 ± 1.73	-0.24 ± 2.60	0.55 (-0.08 – 1.18)	0.0855
Circumference difference, 12cm	0.18 ± 2.31	-0.31 ± 2.83	0.23 (-0.49 – 0.95)	0.5164
Circumference difference, 16cm	0.42 ± 2.78	-0.27 ± 2.88	-0.09 (-1.07 – 0.91)	0.8586
Circumference difference, 20cm	0.65 ± 2.43	-0.18 ± 2.61	0.10 (-0.74 – 0.94)	0.8067
Circumference difference, 24cm	6.25 ± 34.28	0.11 ± 3.45	9.65 (-9.63 – 28.93)	0.3106
Circumference difference, 28cm	8.72 ± 45.96	0.42 ± 3.95	11.63 (-12.55 – 35.80)	0.3295
Circumference difference, 32cm	9.69 ± 53.23	0.65 ± 4.21	14.43 (-15.57 – 44.43)	0.3293
Circumference difference, 36cm	12.51 ± 66.80	0.69 ± 4.04	16.58 (-18.55 – 51.72)	0.3383
Circumference difference, 40cm	12.08 ± 70.76	1.13 ± 6.37	18.90 (-20.99 – 58.79)	0.3364

Table 1. Differences between measurement methods.

REFERENCES

- Jill M Binkley, Michael J Weiler, Nathan Frank, Lauren Bober, J Brandon Dixon, Paul W Stratford, Assessing Arm Volume in People During and After Treatment for Breast Cancer: Reliability and Convergent Validity of the LymphaTech System, *Physical Therapy*, Volume 100, Issue 3, March 2020

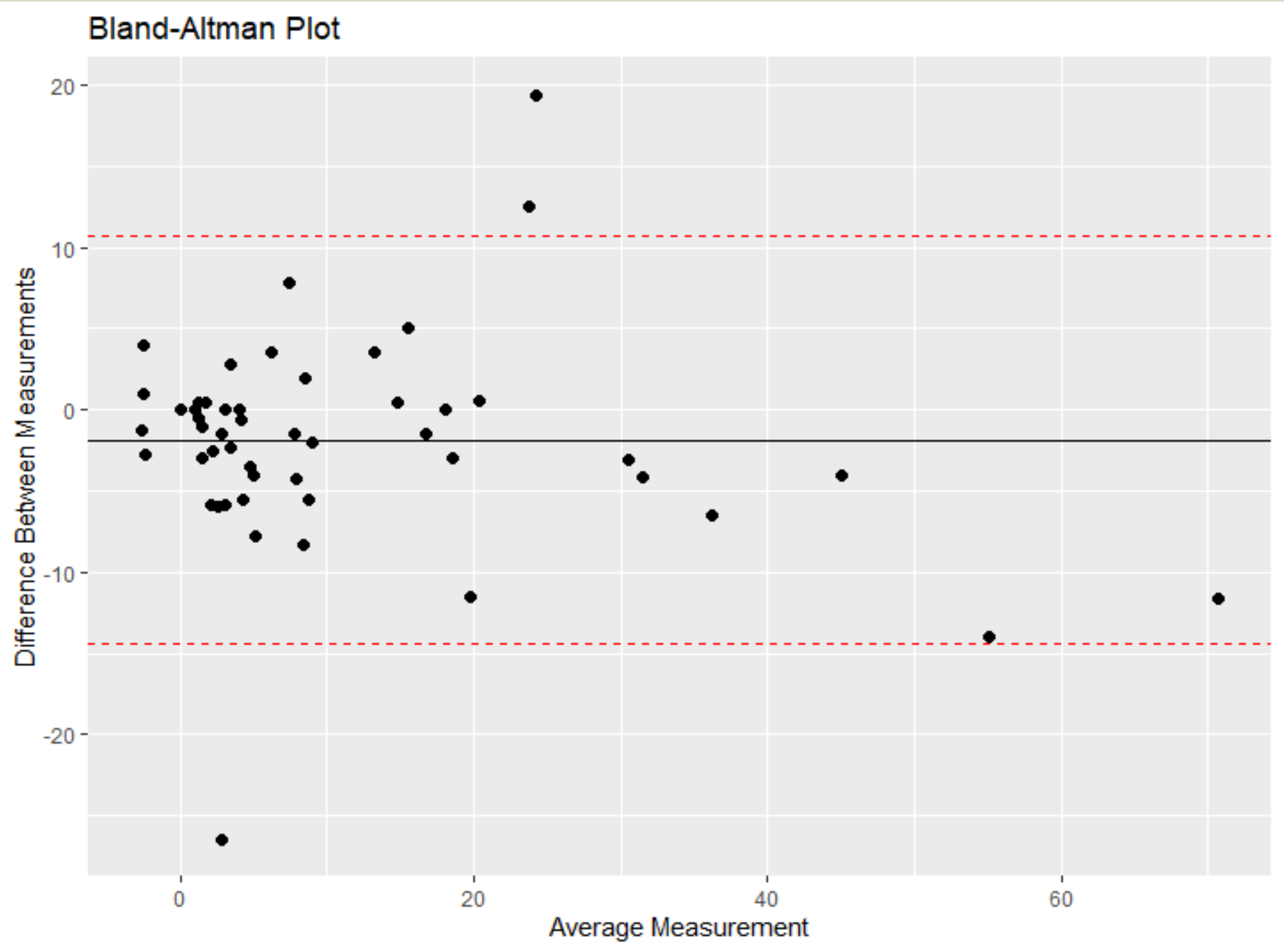


Figure 1. Bland-Altman plot of mean differences between measurement methods.

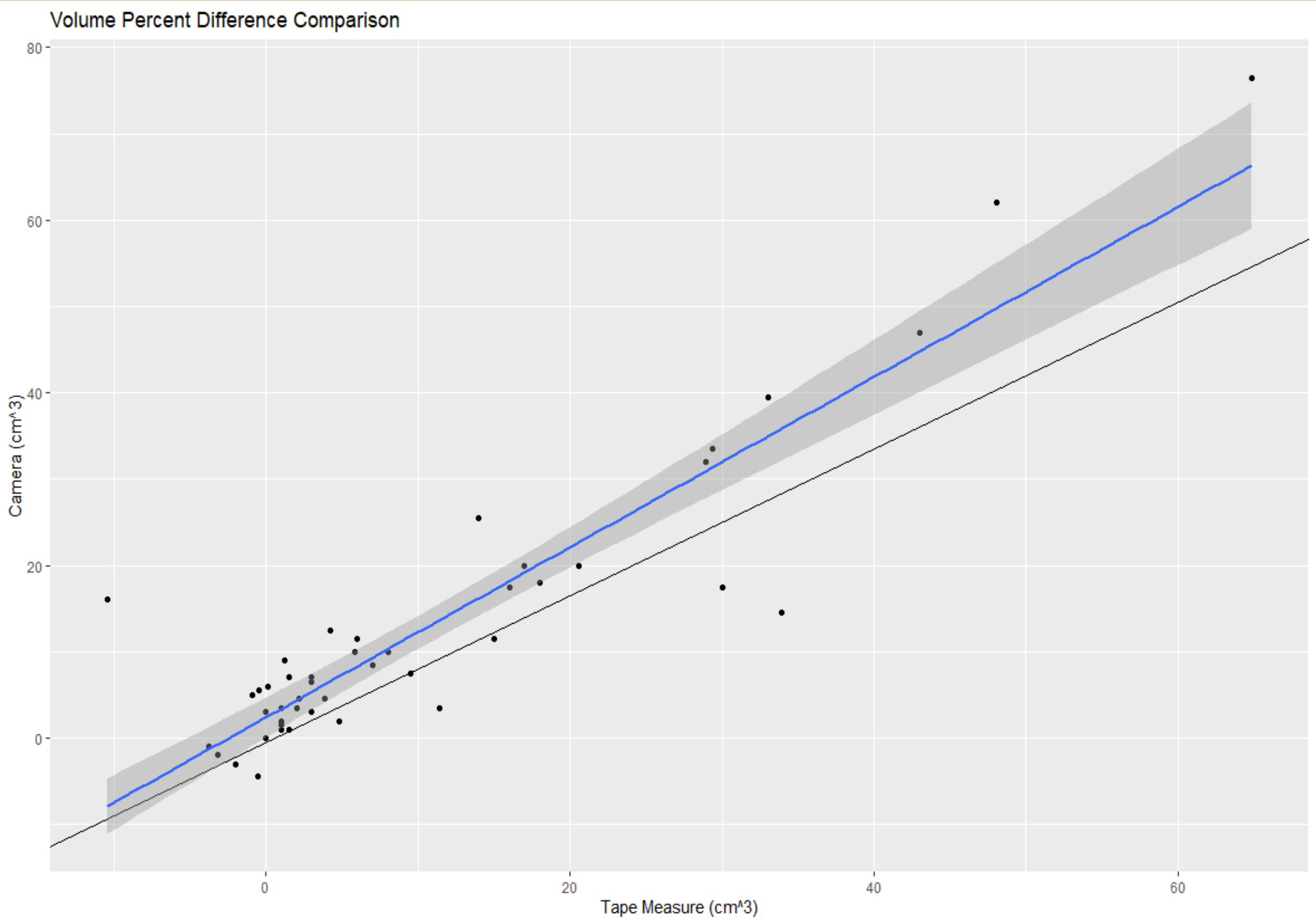


Figure 2. Linear regression curve for percent difference in volume (cm³) as measured by 3D scanner and tape measurement.