Abstract for ARVO

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Title: Inter-optometrist and intra-optometrist agreement for Intraocular Pressure (IOP) measurement by Goldmann Applanation Tonometry (GAT).

Purpose: Research into agreement between GAT measurements taken by two optometrists is lacking. Reliability of GAT is assessed in this study by comparing agreement between IOP readings obtained by two experienced optometrists and measuring agreement between two readings obtained by each optometrist. Knowledge of agreement between readings and between optometrists could improve glaucoma referral quality from community optometrists, reducing false positive referrals to glaucoma specialists.
Methods: Participants were recruited from a university clinic, university staff and students. IOP was measured in the study eye (SE) twice by two optometrists (RO1 and RO2), both experienced in GAT. To minimise subjectivity in IOP measurement, GAT readings were obtained in a masked manner i.e. RO1 adjusted the force on the GAT probe, informing RO2 when the end-point was reached. RO2 recorded the IOP reading and re-set the force on the GAT probe to a randomly selected value between 10g and 20g before the measurement procedure was repeated. Two further GAT measurements were taken on the SE with RO2 now adjusting the probe and RO1 recording IOP. Inter- and intra-optometrist variability were calculated using Bland–Altman analysis.
Results: 41 participants, median age 36yrs (IQR: 20, 49) and 71% female, had IOP measured in the randomly selected SE. Mean difference (95% LoA) in IOP measurements for inter-optometrist agreement was 0.29mmHg (7.27 mmHg to -6.68mmHg) with 63%/81% of inter- optometrist IOP readings within ±2/±3mmHg of each other (Figure 1). Mean difference (95% LoA) in IOP measurements for intra-optometrist agreement for RO1=-0.17 mmHg (4.32mmHg to -4.66mmHg) and for RO2= -0.12mmHg (3.60 mmHg to -3.85mmHg) with 83%/88% of readings for RO1 and 85%/90% of readings for RO2 being within ±2/±3mmHg of each other.
Conclusion: The mean differences for inter- and intra-optometrist agreement are minimal. The 95%LoAs and percentages of intra- and inter-optometrist measurements within ±2/±3mmHg of each other suggest that while agreement is good in the majority of measurements, substantial variation can occur, as previously observed for GAT measurements obtained by non-optometrists. These findings suggest that it may be unwise for community optometrists to rely on a single GAT reading when referring suspect glaucoma cases.

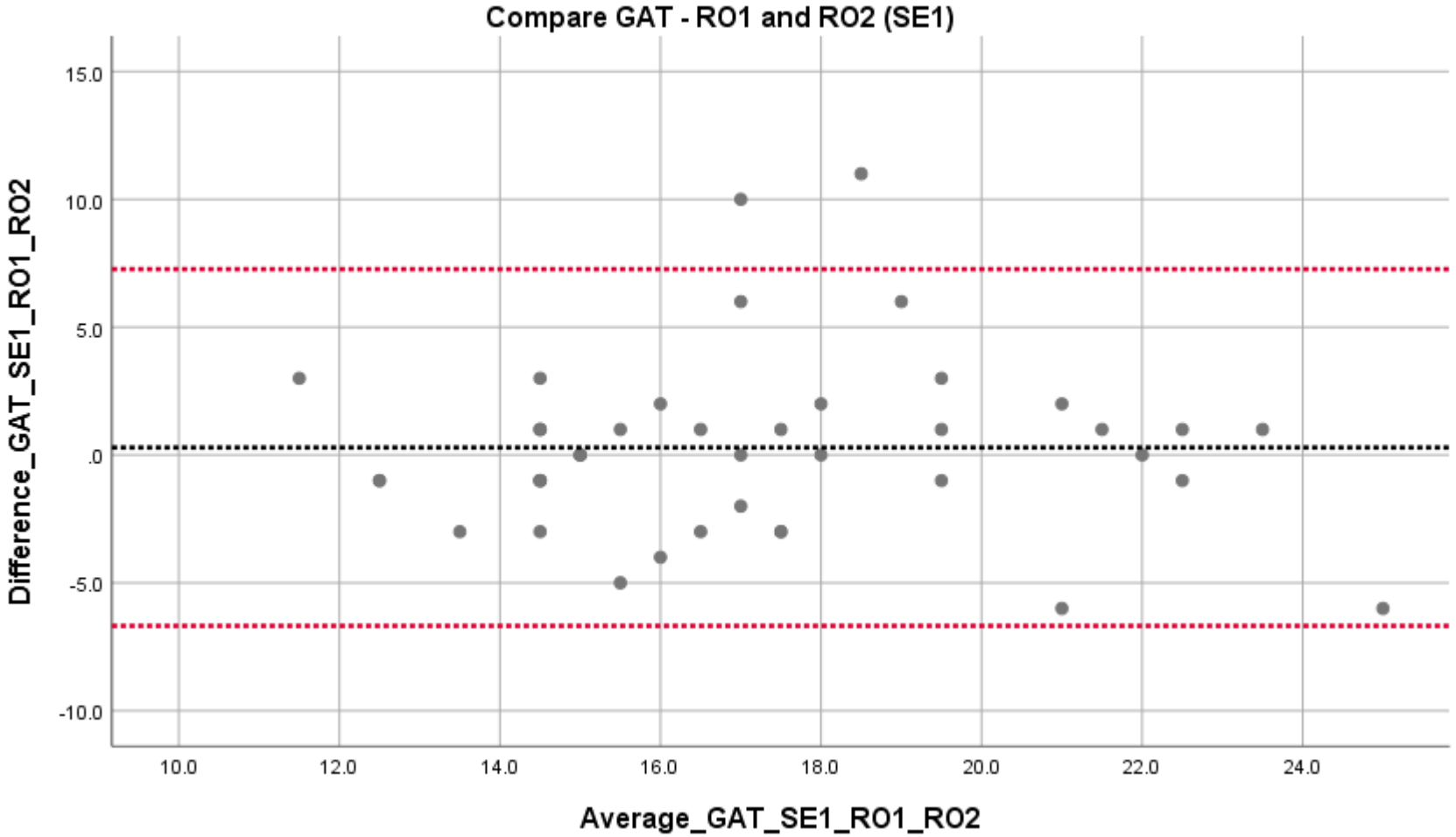

Figure 1: Bland–Altman difference plot showing the inter-optometrist agreement in GAT IOP measurements between two experienced optometrists.