Is Regression Gain or Instantaneous Gain the most reliable and reproducible gain value when performing video Head Impulse Testing of the lateral semicircular canals?

Jacobsen, Chris Ladefoged; Abrahamsen, Emil Riis; Skals, Regitze Kuhr; Hougaard, Dan Dupont

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Introduction
With the advancement of vestibular testing modalities, the video Head Impulse Test (v-HIT) has earned a prominent place in the clinical setting. It is now possible to test all of the semi-circular canals (SCCs) fast and efficiently.

The v-HIT systems provide information about the function of the vestibular ocular reflex (VOR) by means of two modalities: SACCADES and GAIN (the ratio between eye and head velocities). The EyeSeeCam® v-HIT system presents the gain value as:

- **Regression gain**
- **Instantaneous gain**

**Objective**

**Primary endpoint:**
- Is instantaneous gain or regression gain the most reproducible and reliable gain value when performing v-HIT with testing of the lateral SCCs?

**Secondary endpoints:**
- Comparison of each of the instantaneous gain values at 40, 60, and 80ms.
- Investigate any intra- and inter examiner variability when comparing gain values between an inexperienced and an experienced neurotologist.

**Methods**

60 subjects between 18-65 years without any prior history of vestibulotibular disease were included. Prior to inclusion all subjects filled out a questionnaire as well as a Dizziness Handicap Inventory (DHI). All subjects underwent two complete v-HIT test sessions by an experienced and an inexperienced examiner respectively. The order of the examiners and the sequence of the SCC being tested were randomized.

**Results**

All subjects underwent two complete v-HIT test sessions by an experienced and an inexperienced examiner respectively. The order of the examiners and the sequence of the SCC being tested were randomized.

**Discussion**

When comparing the individual instantaneous gain values (40, 60, 80ms) with the regression gain, we found that the gain values at 40ms had the greatest standard deviation (sd) when comparing with regression gain (p-value <0.001, 95% CI [0.03;0.05]) mean sd 0.04

**Conclusion**

- Regression gain is more reproducible than instantaneous gain.
- 40ms is the least reproducible of the instantaneous values.
- There was no significant difference at 60ms or 80ms of the instantaneous gain.
- No significant intra or inter examiner variability (experienced/inexperienced).

**References**

- Cleworth TW, Carpenter MG, Honegger F, Allum JHJ. (2016). Reliability and comparison of gain values at specific latencies (40, 60, 80ms) with the regression gain, we found that the

**Figure 1** Report after lateral SCC testing of a person without vestibular pathology depicting both Instantaneous and Regression gain.

**Figure 2** Test profile

**Figure 3** Mean standard deviation of the different gain types.

**Figure 4** Standard deviations of the different gain types performed by the experienced/inexperienced doctor.

**Table 1** Instantaneous vs. regression gain with regression gain as reference

**Table 2** Instantaneous gain values at 40 and 80ms compared to 60ms

Authors declare no conflicts of interest. Contact info: chlaj@rn.dk