Ordering spectacles online: how good are patients at taking measurements?

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INTRODUCTION

- Online spectacles ordering is increasingly common. Websites offer low cost ophthalmic lenses and frames shipped to patients, after they enter prescription data and self-measured parameters, including pupillary distance
- Other measurements traditionally measured by professional dispenser (optometrist or optician), such as vertical optical centration, are often not measured on line
- Spectacles dispensed with errors in pupillary distance and vertical optical centration may lead to clinically significant symptoms
- Alderson et al. showed that 13% of spectacles ordered online had significant horizontal prism effect. However, there is no evidence that these prismatic effects are caused by measurement errors, seizure errors, or fitting errors

PURPOSE

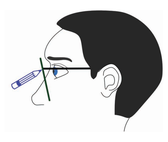
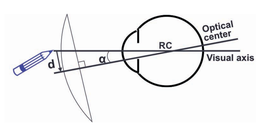
- The purpose of this study is to compare patient-measured pupillary distance during online ordering of spectacles with those of a skilled ophthalmic dispenser
- To compare online manufacturers' optical center heights with those measured by a skilled ophthalmic dispenser

METHODS

- Thirty-six participants (n = 72 eyes), aged 18 – 35 and naïve to optics and optometry
- On-line measures :
  - Three simulated online spectacles orders in a randomized order, using each site's method to self-measure their horizontal pupil distance
  - A pair of -3.00D spectacles had previously been ordered from each site: their vertical optical height was compared to that measured by a skilled dispenser for each participant
- Measures by a skilled ophthalmic dispenser
  - Horizontal pupil distances were measured on each participant using a corneal reflection pupillometer and vertical optical centrations were measured with a rule in a primary position

Web site	Horizontal pupil distance measure	Vertical optical centration
GLASSIFYME	Face picture with a credit card	Pre-determined
clearly	Printed ruler with a mirror	Pre-determined
ZENNI	Printed ruler with a mirror	Pre-determined
Skilled ophthalmic dispenser	Corneal reflection pupillometer	Rule with vertical decentration of OC to compensate for pantoscopic angle

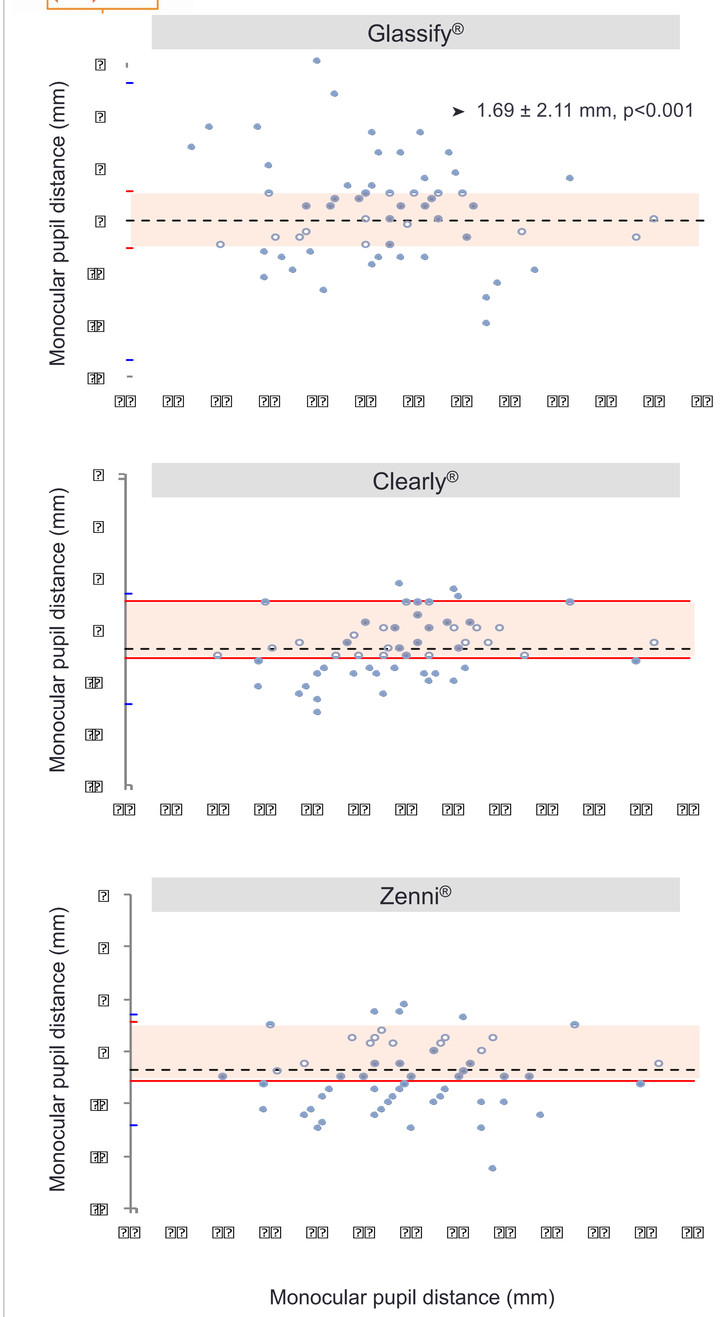


RESULTS

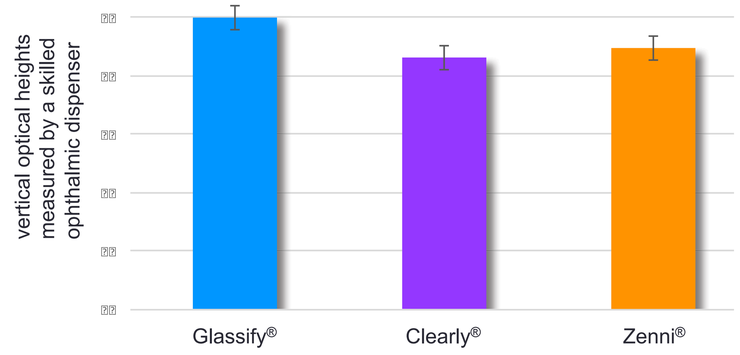
- For horizontal pupil distance measurements, differences between self-measured and dispenser-measured monocular measure were statistically significant (Glassify® 1.69 ± 2.11mm, p<0.001 ; Clearly® 1.08 ± 0.74mm, p<0.001; Zenni® 1.33 ± 0.87mm, p<0.001 – one sample t-test, 0 vs. difference between measurements).
- Many measurements were outside of clinically significant tolerance limits (ISO norm, ±1.1mm for monocular horizontal centering): 46% (n = 33) for Glassify®, 39% (n = 28) for Clearly® and 53% (n = 38) for Zenni®

Horizontal pupil distance measure for each company



Vertical optical centration

- Differences between manufactured and measured vertical optical heights also showed statistically significant differences
  - (Glassify® 4.50 ± 2.66mm, p < 0.001 ;
  - Clearly® 3.30 ± 2.47mm, p < 0.001 ;
  - Zenni® 4.22 ± 2.58mm, p < 0.001
- one sample t-test, 0 vs. difference between measurements)
- Most measurements were outside of clinically significant tolerance limits (ISO norm, ± 0.84mm for vertical centering):
  - 94% (n = 68) for Glassify®,
  - 93% (n = 67) for Clearly®
  - 90% (n = 65) for Zenni®



Absolute means of the decentrations


Glassify : 1.69 ± 2.11 mm, p<0.001


Clearly: 1.08 ± 0.74mm, p<0.001


Zenni: 1.33 ± 0.87mm, p<0.001

REFERENCES

1. Alderson AJ, Green A, Whitaker D, Scally AJ, Elliott DB. A Comparison of Spectacles Purchased Online and in UK Optometry Practice. Optometry and vision science : official publication of the American Academy of Optometry. 2016;93(10):1196-202

TAKE HOME MESSAGE

- Online spectacles ordering, using patient-measured pupil distance and lack of personalized vertical optical heights, is often outside the recognized optical industry standards and may lead to significant optical errors