Prism vs. Prozac: A Novel Approach to the Amelioration of Anxiety With Prismatic Lens Treatment of Vertical Heterophoria

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Background: Vertical Heterophoria (VH) is a little recognized binocular vision disorder characterized by symptoms of headache, dizziness, anxiety, neck pain and difficulty with reading which is corrected by use of prismatic lenses as described in a previous study. The objective of this study is to utilize validated survey instruments and other metrics to quantify the reduction of anxiety (as well as dizziness and headache) resulting from prismatic lens intervention in VH patients with prominent anxiety.

Methods: This retrospective analysis included eighteen patients presenting to an optometric binocular vision subspecialist with anxiety who were subsequently diagnosed with VH. Data was collected prior to and at the conclusion of VH intervention from validated survey instruments (Zung Self-Rating Anxiety Scale (Zung), Dizziness Handicap Inventory (DHI), Headache Disability Index (HDI); from the Vertical Heterophoria Symptom Questionnaire (VHSQ) (a self-administered VH symptom assessment instrument developed by the authors to determine VH symptom burden); from a subjective rating (0-10 scale) of anxiety, dizziness and headache severity; and from a sub-analysis of VHSQ questions that pertain specifically to anxiety, dizziness and headache. Upon conclusion of treatment, subjective assessment of overall improvement of VH symptoms was obtained utilizing a 10 cm visual analog scale (VAS). Effect of treatment was analyzed using paired t-test.

Results: When compared with pre-intervention baseline, realigning prismatic lens intervention resulted in a relative reduction in the Zung (20.0%; $p<0.01$); DHI (54.1%; $p=0.0006$); HDI (36.3%; $p=0.1109$); 0-10 scores for anxiety (53.7%; $p\leq0.0001$), dizziness (54.1%) and headache (48.5%); three VHSQ anxiety questions (51.9%; $p=0.002$); six VHSQ dizziness questions (57.4%); and two VHSQ headache questions (52.3%). Total VHSQ score reduced by 55.0% ($p\leq0.0001$). There was a 72% decrease in subjective overall VH symptom burden as measured by the VAS ($p\leq0.0001$). (Figure 1)

Discussion

VH has been an uncommonly diagnosed and poorly understood binocular vision disorder. We suspect that this is due in large part to the inconsistent performance of the current tests used to identify the direction and amount of VH (demonstrated in our unpublished data as well as other sources (Gray, 2008; Schroeder et al., 1996; Gall & Wick, 2005) which makes diagnosing, treating and researching this condition almost impossible. To address this challenge, we developed an alternative method for diagnosing and treating VH (Doble et al., 2010) that does not rely upon the use of the current tests. In those patients with physical findings or symptoms suggestive of VH (see below), we utilize the ***VHSQ*** (a VH symptom assessment instrument developed by the authors to determine VH symptom burden) to identify ***VH suspects*** (those who would benefit from binocular vision subspecialist consultation). We then ascertain whether appropriately applied vertically correcting prismatic lenses result in significant symptom reduction (***Prism Challenge***).

Physical Findings of VH
Physical findings indicative of VH may include head tilt [Figure 2], worsening of headache with eye movement, worsening of headache / dizziness / nausea with Near Point of Conversion (NPC) testing, veering to one side with ambulation, tender trapezius muscles and furrowed brow.

VH Symptoms Are Prevalent in Anxiety Patients
This study demonstrates that VH symptoms are prevalent in this anxiety patient cohort, yet traditionally most of this information is not sought from patients with anxiety. Figure 3 lists these symptoms by category and frequency. The VHSQ queries a representative sample of these VH symptoms and is used for identifying VH suspects.

The Connection Between VH, Dizziness and Anxiety
Given that balance and postural control are dependent upon the integration of information from the vestibular, proprioceptive, and visual sensory systems (Redfern et al., 2001), it is conceivable that a visual disorder could be the etiology of a balance disorder. While there are many examples of vestibular and proprioceptive disorders that precipitate balance disorders, the exact nature of visual disorders that precipitate balance disorders is less well understood. Redfern et al. (2001) conclude from Jacob et. al. (1995), that "there may be an increased sensitivity to vision by the postural control system in patients with anxiety disorders and associated SMD (space and motion discomfort)" (p. 88). They speculate further that "increased reliance on non-vestibular channels for balance information may lead to situationally specific symptomatology (i.e. SMD) that might predispose for the development of agoraphobia or height phobia" (p. 88). Guerraz et al. (2001) studied a condition called *Visual Vertigo*, in which certain complex disorienting visual stimuli (walking down supermarket aisles or in crowds or in structures with high ceilings; driving; or observing moving objects) provoked or exacerbated dizziness symptoms. They concluded that dizziness occurred in these patients due to difficulties resolving sensory conflict between visual and vestibulo-proprioceptive inputs, with an over-reliance on the visual inputs.

While the association between vision and balance disorders is poorly understood, the association between balance disorders and panic disorders is well documented. In panic disorder samples, vestibular disorders are common, and panic disorder is common in patients with vestibular complaints. Approximately 50% to 90% of panic disorder patients report dizziness, and it is the second most frequently occurring symptom (Asmundson et al., 1996; Margraf et al. 1996).

Currently a direct association between VH (a visual disorder) and anxiety is not generally recognized. Our research indicates that the dizziness / balance / vestibular symptoms that are being precipitated by VH appear to be directly linked to the anxiety symptoms seen in this patient population. This observation is supported by the fact that with treatment of the VH with prismatic lenses, there is a significant reduction of the validated instruments for dizziness and anxiety; and corroborated by the fact that in our clinical practice, significant reduction of anxiety and dizziness occurs within 20-30 minutes of the first application of vertically correcting prismatic lenses.

While the results of this study are promising, several limitations should be noted. While the patients in the study reported significant anxiety and dizziness, they were not diagnosed with a clinical interview or with DSM criteria. This limits the ability to generalize the findings to

specific anxiety disorder groups. In addition, there was no placebo control group to rule out placebo effects. However, placebo effect seems unlikely for 3 reasons:

1. the large amount of symptom reduction (as demonstrated in our metrics)
2. in our experience, symptom reduction has remained stable over time
3. in our experience, prismatic lenses worn by those who do not need them cause VH symptoms to develop.

Another limitation is the lack of follow-up assessment. We are currently investigating the prevalence of VH in carefully diagnosed anxiety disorder patients seeking treatment at an anxiety clinic in the psychiatry department of a major medical school.

Conclusions

In our anxiety patient cohort, treatment of a binocular vision condition (VH) with prismatic lenses resulted in marked reduction of all metrics for anxiety, as well as for headache and dizziness, which coincided with the patient's perception of overall VH symptom reduction. These findings suggest that patients with anxiety disorders should be assessed for VH. While VH symptoms are prevalent in this anxiety patient cohort, VH is rarely diagnosed due to clinical unfamiliarity with this condition and inaccurate clinical diagnostic tests. New methods for accurately identifying VH patients (utilization of the VHSQ combined with Prism Challenge technique) appear promising.

Figure 1

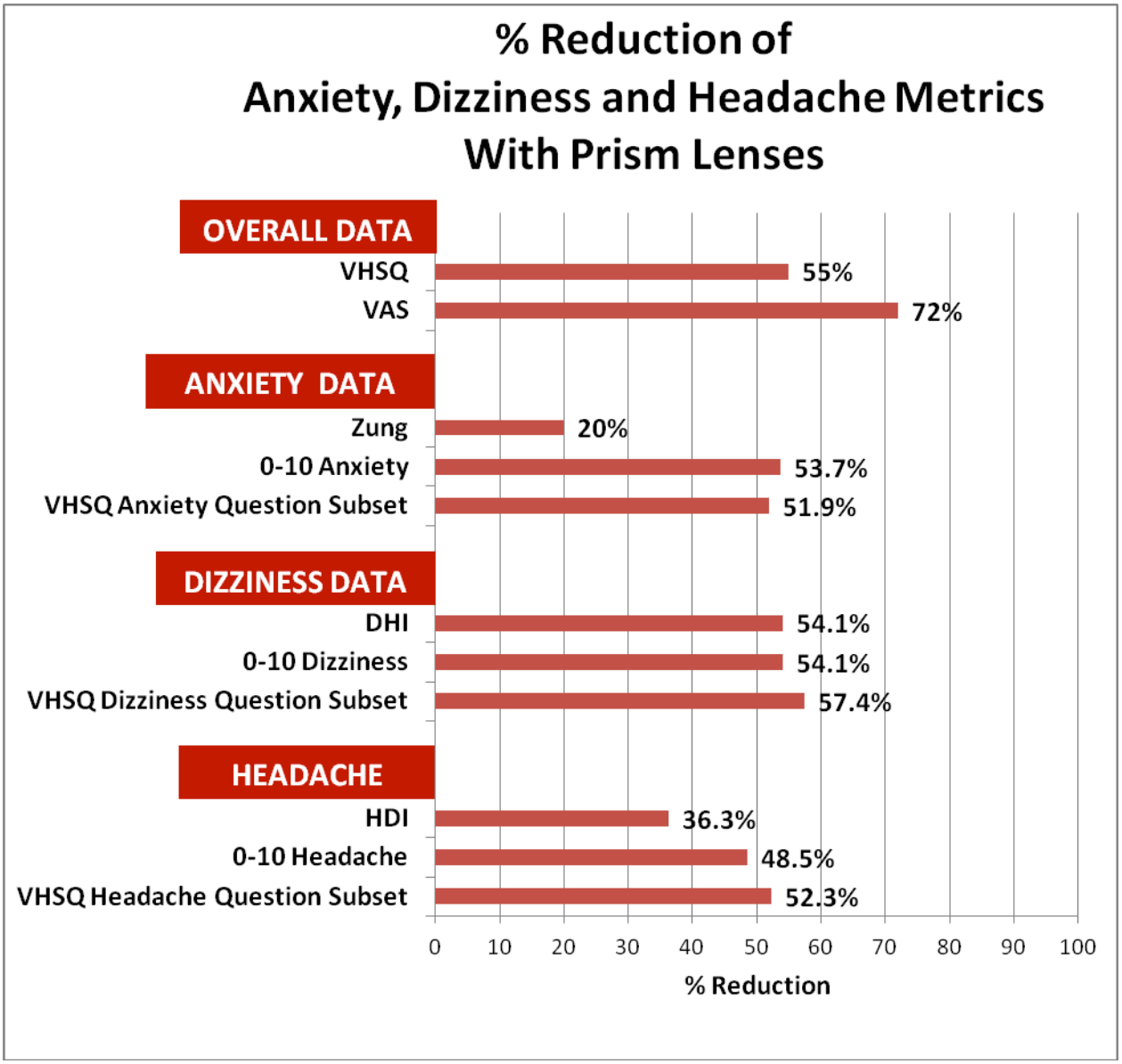
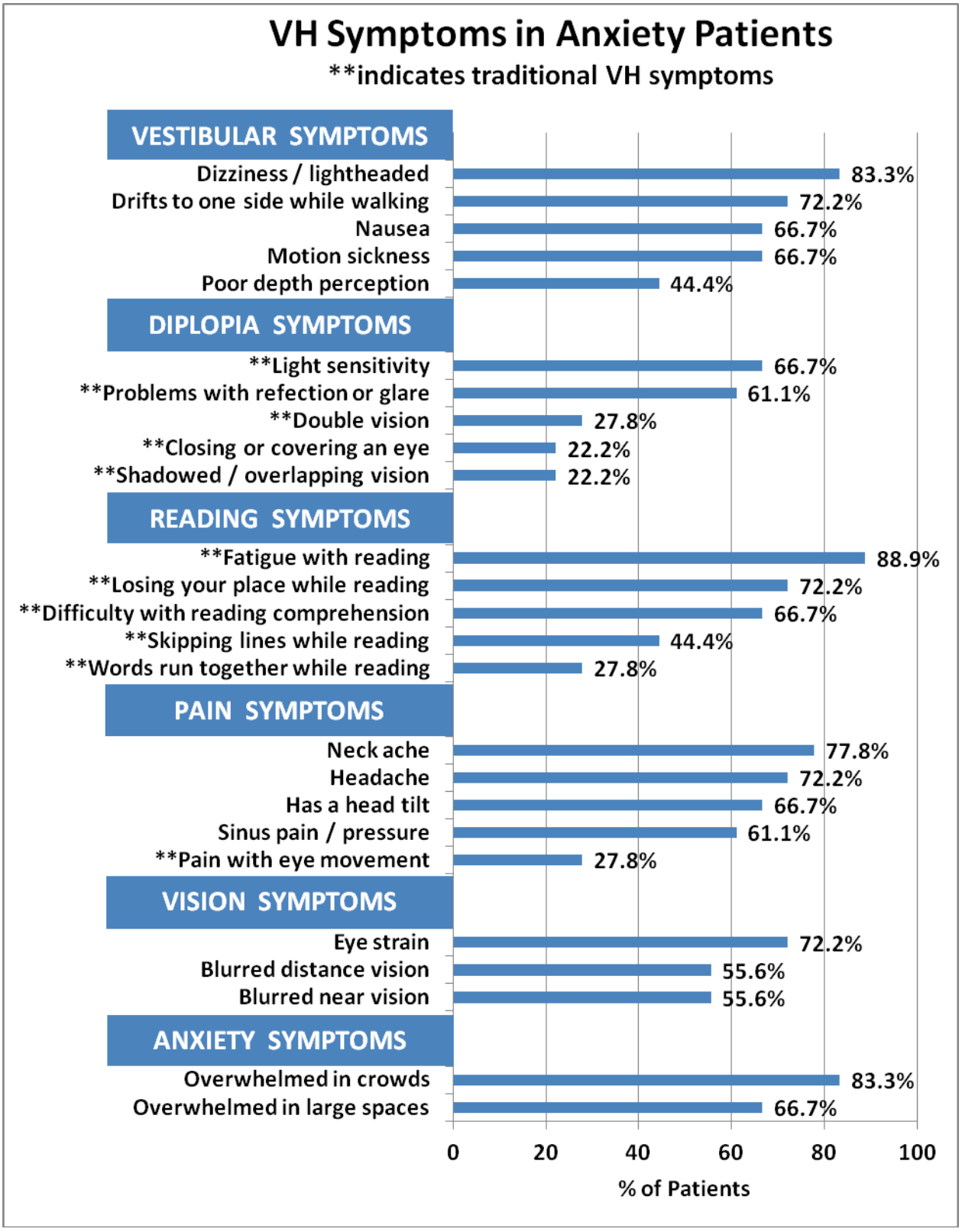


Figure 2: Head Tilt

Figure 3


VH Symptoms in Anxiety Patients
**indicates traditional VH symptoms
VESTIBULAR SYMPTOMS
Dizziness / lightheaded
83.3%
Drifts to one side while walking
72.2%
Nausea
66.7%
Motion sickness
66.7%
Poor depth perception
44.4%
DIPLOPIA SYMPTOMS
**Light sensitivity
66.7%
**Problems with refection or glare
61.1%
**Double vision
27.8%
**Closing or covering an eye
22.2%
**Shadowed / overlapping vision
22.2%
READING SYMPTOMS
**Fatigue with reading
88.9%
**Losing your place while reading
72.2%
**Difficulty with reading comprehension
66.7%
**Skipping lines while reading
44.4%
**Words run together while reading
27.8%
PAIN SYMPTOMS
Neck ache
77.8%
Headache
72.2%
Has a head tilt
66.7%
Sinus pain / pressure
61.1%
**Pain with eye movement
27.8%
VISION SYMPTOMS
Eye strain
72.2%
Blurred distance vision
55.6%
Blurred near vision
55.6%
ANXIETY SYMPTOMS
Overwhelmed in crowds
83.3%
Overwhelmed in large spaces
66.7%
0
20
40
60
80
100
% of Patients

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