

Dynamic Visual Acuity (VA) Test**Background**

The global eye testing equipment market was valued at USD \$2.64 billion in 2017 and is expected to reach \$3.91 billion by 2025, registering a CAGR of 5.0% from 2018 to 2025. Significant increase in the incidence of eye-related disorders across the world has played a major role in driving the growth of eye testing equipment market. Visual acuity (VA) is a measure of the ability of the eye to distinguish shapes and the details of objects at a given distance. VA is influenced by many factors including the eye itself and environmental influences. The eye media (primarily the cornea and lens) are responsible focusing light on the retina and modulating VA. Any interruption of this optical pathway can lead to reduced VA. For instance, if the media do not focus the incoming light on the retina, but instead focus it in front of the retina (short-sightedness), or behind it (long-sightedness), or if one focus point on the retina is not attained (astigmatism) VA will be reduced and shapes and details will appear blurry. In addition, damage to the eye media, the retina or the optic nerve can also lead to reduced VA.

Description of the invention

Traditional high contrast, static VA charts do not represent the visual demands of many sports (i.e. ice hockey, soccer, etc.) or daily life activities (i.e., driving) because the optotypes are not moving. Additionally, the optotypes of traditional static VA charts are all high contrast targets on a white background. In sport and daily life activities, targets are often moving, many things are coloured and contrast between objects is not always high (i.e. detecting the seams on a spinning baseball).

Current competitive computerised dynamic VA charts only use optotypes that move in a predictable horizontal or rotational direction or only use high contrast targets on a white background. None of the commercially available dynamic VA tests are validated (i.e. they have not been compared to the gold-standard static VA tests and their test-retest reliability has not been examined) which limits their clinical utility.

Waterloo's Dynamic VA Test (moV&) assesses a number of different visual acuities using different optotype target motions, speeds, colours and contrasts, thereby addressing limitations of its competitors. By measuring static, random motion, horizontal, vertical and oblique motion as well as jitter, our technology overcomes the limitations of having predictable motion patterns. It also overcomes the issues with having optotypes that do not change because each letter presented is randomly selected from 4 to 10 different letters (depending on the optotype chosen). This technology has been validated and used in research comparing the dynamic VA of athletes to video gamers and non-athletes and in classification research for Paralympic athletes with vision impairment.

Advantages

- Measures static and dynamic VA at high and low contrast, with different target/background colours and motion types.
- Uses a common clinical VA unit, is validated and has a test-retest reliability comparable with that of clinical gold standard static VA measurements.

Potential applications

- Optometrists and eye-care practitioners (especially in sports performance or low vision).
- Clinical diagnostic test predictive of sports, driving, or other functional task performance, or as a marker or vision rehabilitation in patients with concussion for example.

Reference

10186

Patent status

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Stage of development

Prototype developed, looking for industry partners to validate results

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