**Multiplexing prism for field expansion of acquired monocular vision & normal sight**

Jae-Hyun Jung and Eli Peli

Schepens Eye Research Institute, Massachusetts Eye and Ear, Harvard Medical School, Boston, MA

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### Acquired Monocular Vision (AMV)

- Loss of an eye or loss of sight of one eye is frequently due to injury and it affects the daily life significantly.
- The loss of visual field on one side has no effective solution currently.
- The retina areas blocked by the nose, do not function visually.

### Field expansion devices for AMV

- **Rotation reduces total internal reflection**
  - Prism rotation reduces angle - number of effective prism segments
  - Prism rotation increases number and area of effective segments

### Multiplexing Prism (MxP)

- **Field expansion of AMV rugby player**
  - Nasal field of AMV player to be expanded by multiplexing prism mounted in the approved safety goggle.

### Optical correction for a left AMV using MxP

- Multiplexing Fresnel prism over the bridge of the nose in a single lens wrap around sunglasses
- Both expanded visual field by prism shift and see-through visual field (normal visual field) are shown by multiplexing prism

### Expanding the normal peripheral field

- Multiplexing Fresnel prism on temporal ends of wrap around sunglasses lenses
- Expanded visual field by prism shift and see-through visual field (normal visual field) are both available through the multiplexing prism

### Conclusion

- **Prism segment over the nose bridge** expands the nasal visual field
- **MxP segment at temporal periphery** expands peripheral visual field for bicyclists, motorcyclists
- In both applications, the **apical scotoma** is a major limitation
- The **multiplexing prism** overcomes the apical scotoma problem
  - At a cost of reduced contrast and monocular visual confusion
- Appropriate rotation of prism segment can reduce total internal reflection
  - It can also increase the expansion of visual field
  - Objects in the expanded field are minified

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- Dr. Peli has application rights (assigned to Schepens Eye Research Institute) for the Multiplexing prisms
- Supported by the International Rugby Board (IRB)
- Supported by the American Optometric Association (AOA)
- Oncology Vision and Vision Science, 46(1), 89-96
- Vision rehabilitation team management of acquired monocular vision, Optometry and Vision Science. 90(5), 2010
- Consideration of optical effects, confusion, and diplopia when prescribing prisms for homonymous hemianopia, Translational Vision Science and Technology, 2010, article 2
- The field was measured using dark targets on a bright background in our PC-based perimeter to avoid false detections of spurious reflections and scattering

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**Duke Federico da Montefeltro** (15C Italian warrior) had the bridge of his nose removed

**One-Eyed Matador**

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**Image**

- [Field expansion device based on mirror (2013)](https://www.scribd.com/doc/237742404)
- [Semi-silvered mirror device](https://www.scribd.com/doc/237742404)
- [Field expansion of AMV rugby player](https://www.scribd.com/doc/237742404)
- [Field expansion devices for AMV](https://www.scribd.com/doc/237742404)
- [Multiplexing prism](https://www.scribd.com/doc/237742404)
- [Semi-silvered mirror device](https://www.scribd.com/doc/237742404)
- [Field expansion devices for AMV](https://www.scribd.com/doc/237742404)
- [Multiplexing prism](https://www.scribd.com/doc/237742404)