THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

用於早期青光眼檢測的新型視網膜電生理圖測量儀

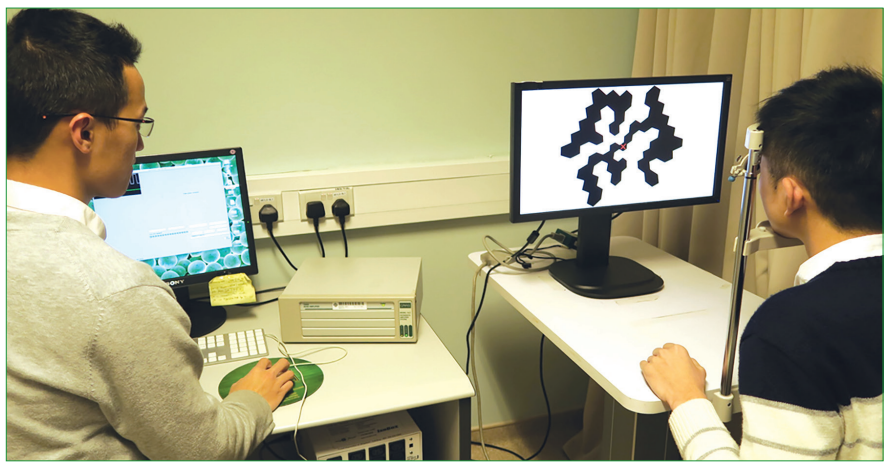
New Electroretinogram Assessment for Early Glaucoma Detection

檢測由早期青光眼變化引起的亞臨床異常視網膜活動及預測青光眼的進展

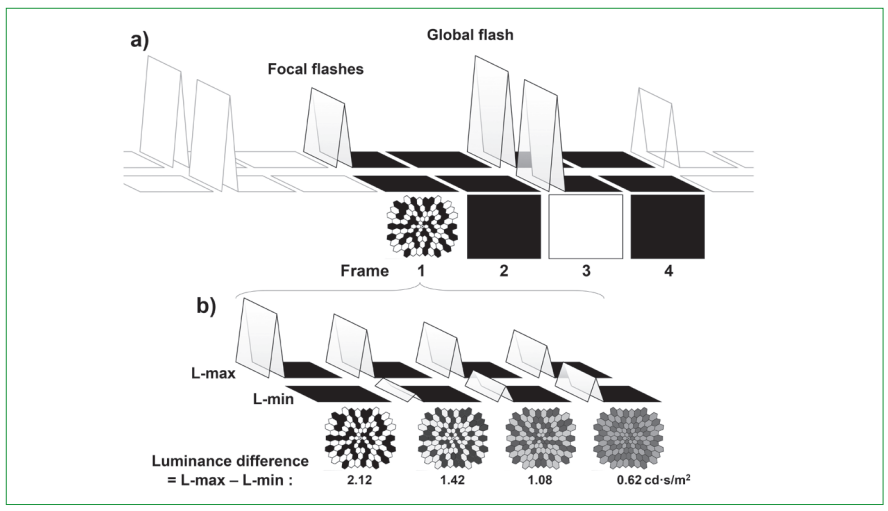
Detecting sub-clinical abnormal retinal activities caused by early glaucomatous changes and predicting glaucomatous progression

青光眼是一種慢性眼疾，通常患者在患病初期並不會察覺任何異常狀況。青光眼的風險因素包括高眼壓、深近視，以及家族中曾有人罹患青光眼。診斷青光眼的標準臨床測試為視野測試；然而，此項測試在患者喪失約25%視網膜神經元後，才能有效量度出變化。

最近，市場上出現了一種可診斷青光眼的光譜域光學相干斷層掃描（SD-OCT）。此技術可以量度視網膜組織的厚度，但結構厚度的變化和神經元喪失，故仍無法在青光眼初期偵察到變化。有見及此，理大的研究團隊開發了一個嶄新的多焦視網膜電生理圖（mfERG）方案，它能在眼睛發生結構變化前偵測到青光眼對眼睛的損害，並能檢測主要受早期青光眼影響的視網膜功能。



多焦視網膜電生理圖檢查
Multifocal electroretinogram measurement



量度參數模型的示意圖
Schematic diagram showing the paradigm of the measurement

Glaucoma is a chronic eye disease that shows no symptoms in early stages. Risk factors for developing it include high intra-ocular pressure, high myopia and a family history with glaucoma. To diagnose glaucoma, a standard clinical test called Visual Field testing is usually used. However, it is reported that only after the patient loses about 25% of his retinal neurons can a change be detected.

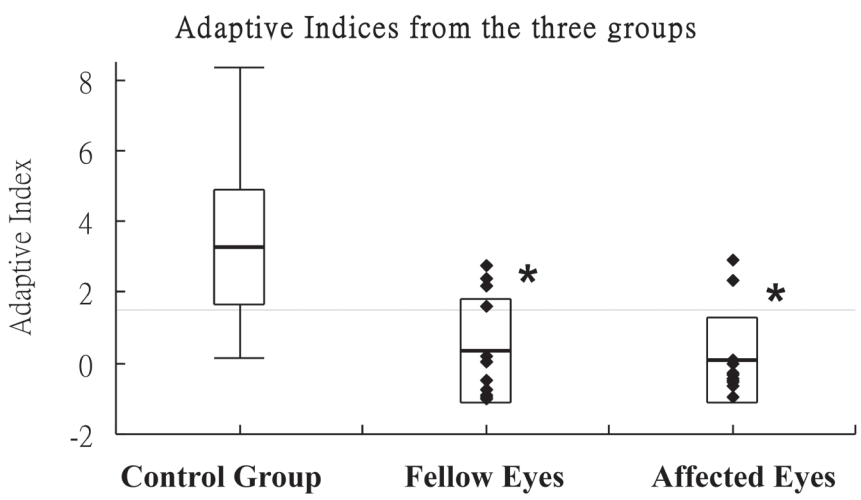
Recently, the Spectral-domain Optical Coherence Tomography (SD-OCT) test is used to measure the thickness of the retinal tissue for glaucoma detection. However, the change of structural thickness is also related to the loss of neurons. Hence, this test cannot be used to detect early changes in glaucoma either. In light of this, PolyU has developed a new protocol of multifocal electroretinogram (mfERG), which can detect glaucomatous damage before the onset of structural changes, and to test the retinal functions that are primarily affected by early glaucoma.

特色與優點

- 在高風險病例中，可於常規臨床評估發現變化前檢測到異常視網膜反應
- 在早期青光眼檢測中，比傳統臨床評估檢測至少早3至4年發現異常視網膜反應

應　用

- 協助醫務人員及早發現早期青光眼的變化，有助患者儘早接受治療，以挽救視力
- 預測青光眼的惡化情況



與對照組相比，單側青光眼患者雙眼的視網膜功能指數均有顯著下降
Statistically significant reduction of retinal function in both the affected and fellow eyes of the glaucoma subjects when compared with the control group

Special Features and Advantages

- Can detect abnormal retinal responses in high risk cases before any clinical manifestation is found in conventional clinical assessments
- Can detect abnormal retinal responses in early glaucoma at least 3-4 years before any manifest damage is detected in conventional clinical assessments

Applications

- Support practitioners to detect early glaucomatous changes, so that patients can receive appropriate treatments as early as possible to save the vision
- Predict the progression of glaucoma

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