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Étude de l'effet pop-out chez le sujet héminégligent

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Mots clés : Héminégligence ; Test informatisé ; Test de barrage ; Saillance ; Lésion pariétale

Contexte.– L'héminégligence est un syndrome caractérisé par des perturbations de l'exploration spatiale de l'hémichamp gauche avec un comportement dévié vers la droite. De part la diversité de ses manifestations et des atteintes cérébrales pouvant en être à l'origine, l'héminégligence pose problème, aussi bien sur le plan physiopathologique, diagnostique que thérapeutique. Nous avons transposé sur interface informatique le test de barrage des cloches (Gauthier 1989).
Objectif.– Établir les effets de la saillance, globale ou prédominante à gauche, par la couleur et/ou par le mouvement sur l'exploration visuelle selon chaque hémichamp.
Trois groupes de patients cérébrolésés sont évalués : 24 patients diagnostiqués héminégligents, 12 patients ayant récupéré totalement de leur héminégligence et 12 patients n'ayant jamais présenté d'héminégligence.
Résultats.– L'informatisation du test pouvait être considérée comme valide puisqu'il existait une différence significative entre les trois groupes pour le nombre de cibles touchées, la colonne de la première cible et la vitesse d'exécution ($p < 0{,}001$ pour les trois).
Notre étude a permis de mettre en évidence que la vitesse d'exécution des patients héminégligents est améliorée par l'introduction d'une saillance globale par la couleur (1,8 secondes entre deux cibles versus 3,8 secondes entre deux cibles ; $p < 0{,}001$) ou le mouvement (3,2 secondes versus 3,9 ; $p < 0{,}001$). De plus, l'introduction d'une saillance latéralisée à gauche permet d'améliorer la vitesse d'exécution dans cet hémichamp et, donc, de surpasser le biais spatial droit. Ainsi, l'effet pop-out persiste chez les héminégligents dans l'hémichamp droit comme gauche.
Puisque la saillance latéralisée permet aux héminégligents de surpasser leur biais spatial, nous suggérons que des exercices de rééducation via ce support informatique, pourraient aider les patients à gérer leur trouble de l'exploration spatiale.

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English version

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Rehabilitation for acquired visual field deficit: Review and prospects

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Keywords: Visual Field; Hemianopsia; Rehabilitation

Visual field deficit (VFD) is one of the most commonly observed symptoms following brain injury. Persistent VFD and defective exploratory oculomotor scanning patterns often cause severe impairment in daily activities, particularly as regards visual exploration and reading. Homonymous hemianopia is consequently a powerful negative predictor of patient outcome. In spite of these quantitative and qualitative factors, there currently exists no consensus on rehabilitative therapy and treatment. Different approaches have nevertheless been developed, all of them having one therapeutic principle in common; repeated practice of a specific visual task, with the hope/expectation that improved performance will extend to a wide range of ecologically useful visual functions. The four main available methods aim at replacing part of the intact visual field with part of the damaged visual field (optical therapy using prisms), at partially restoring the lost visual field region (restorative therapies), at stimulating detection capacities in the blind field (stimulation or blindsight) or at substituting for the lost region by reorganizing the control of visual information processing and eye movements (compensatory therapies). This review explores the key data relative to these different approaches in terms of behavioral or imagery results. It also aims at critically analyzing the advantages and limits of each one. The importance of strict assessment in terms of deficiencies or disabilities is underlined. Finally, upon consideration of these data taken as a whole, it is suggested that efficient treatment would probably have to associate general components and more specific elements, according to what may be done with regard to other aspects of cognitive rehabilitation. Some recent results have shown that rapid compensatory modifications can be induced on a ecological visual search task by a only training session combining pursuits and saccades, suggesting request of less intentional and more automatic compensatory mechanisms and thus a potential more efficient transfer to daily life activities.

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Can brain stimulation improve prognosis of post-stroke neglect?

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Keywords: Neglect; Stroke; Brain stimulation; TDCS; RTMS

Neglect is a syndrome frequently associated with right hemisphere stroke. Numerous rehabilitation techniques have been developed [1], but this syndrome is associated with a poor functional outcome. The concept of interhemispheric competition is more and more believed to explain this syndrome [2]. Therefore, any intervention aiming at restoring the physiological balance between the brain hemispheres could improve the symptoms.
Non-invasive brain stimulations are emerging in neuro-rehabilitation: transcranial Direct Current Stimulation (tDCS) and repetitive Transcranial Magnetic Stimulation (rTMS) have already shown their ability to modify cortical excitability [3]. Their use for the interhemispheric balance restoration after a stroke is therefore interesting.
We realised a literature review of the studies where the use of these techniques with neglect patients was evaluated. Publications in English referenced in Pubmed were collected, combining "rTMS" or "transcranial magnetic stimulation", "tDCS", "brain stimulation", "neuro-modulation" and "neglect" or "spatial neglect".
Nine original papers were reviewed. Parietal lobe inhibition of the intact hemisphere is the most used strategy. Mainly rTMS was used. Authors report visuo-spatial improvement for the patients with paper and pencil tests. Few papers evaluate generalisation to patients' daily life autonomy.
Despite de rare data, the results seem promising. From a fundamental point of view, the results seem to confirm the interhemispheric competition theory in this syndrome.

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