

CHANGING APPEARANCE USING VISUAL ILLUSIONS IMPROVES OWNERSHIP OF THE PAINFUL HAND IN COMPLEX REGIONAL PAIN SYNDROME

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Background and aims

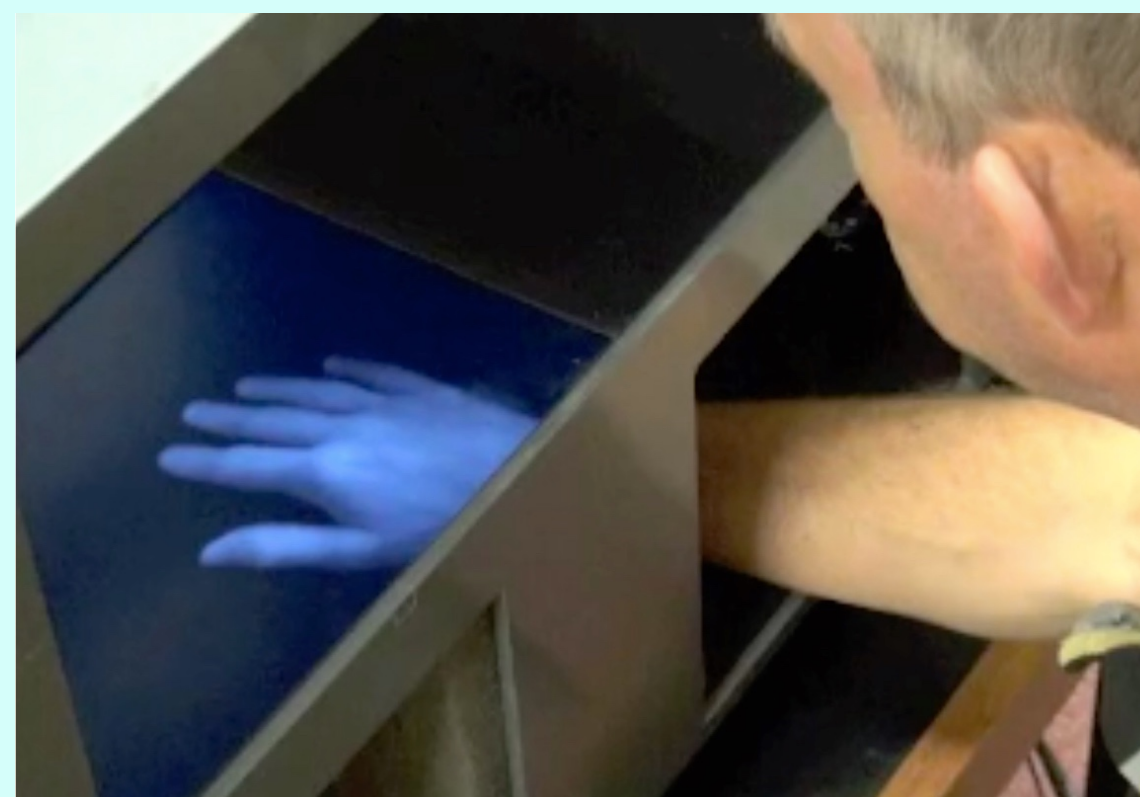
People with Complex Regional Pain Syndrome (CRPS) experience a diminished sense of ownership of their painful limb¹⁻⁵. Evidence of a reduction in pain when the affected limb is visually altered in size ^{6,7}, suggests that targeting central processing by using visual illusions could restore coherence and reintegrate the disrupted limb representation

Methods

We hypothesized that creating visual illusions via the MIRAGE system, a form of augmented virtual reality to change hand appearance, would improve ownership of the hand.

Thirty nine patients with CRPS of one arm were randomly allocated to either a control or experimental group. While both hands were placed in the MIRAGE system, the experimental intervention involved digitally changing the visual appearance of the affected hand according to the patient’s description of how they desired their hand to appear. The procedure was similar with controls except that no visual changes to hand appearance were made. Participants were exposed to the resultant image for one minute. Perceived ownership of their hand was rated at pre and post intervention via the statement ‘*It feels like the hand I am looking at is my hand*’.

Visual illusion created by MIRAGE system



Perceived ownership statement

‘It feels like the hand I am looking at is my hand’

Rating

-3=strongly disagree to +3= strongly agree

Table 2: Perceived ownership rating results

Median difference post-pre (range)		Non parametric test of significance
Experimental	Control	p=0.02
1 (-6 to 5)	0 (-5 to 5)	

Results

Table 1: Participant characteristics

Group	Experimental	Control
N	20	19
Age (years)	51.45 (32-78)	51 (20-73)
Gender (female)	12 (60%)	11 (58%)
Disease duration (months)	50 (4-216)	68 (6-264)
Dominant affected limb	12 (60%)	12 (63%)
Neuropathic Pain Inventory Score	60.5 (1-98)	55 (0 -91)
Current hand pain	6 (0-10)	6 (0-10)

Twenty participants aged 51 (mean; SD=11) with disease duration of 50 months (mean; SD=2.5) reported a significantly improved sense of affected hand ownership post illusion when compared to controls ($p = 0.02$).

Conclusion

Changing the visual appearance according to how those with CRPS would like their affected hand to look improves ownership. These findings may be clinically useful for patients with CRPS.

Acknowledgments

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References

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