of more than 100 to less than 120 mm Hg. Thus, it seems fair to call it normotensive. Nevertheless, in an older patient, a blood pressure under 120/80 mm Hg is often below its usual level and should be compared with previous readings. My concern with the definition of "acute kidney injury" is that it does not yet specify which causes of renal failure are included. For example, Zhou et al. do not include cases due to acute glomerulonephritis or systemic lupus erythematosus.[3] Although Bellomo et al. state that urinalysis lacks diagnostic value for renal failure due to sepsis, the report they cite[4] actually concluded that there were few data on this question and that good studies are needed. My experience is that urinalysis usually correlates well with the clinical picture. The finding of both high and low renal blood flows in studies of experimental septic acute renal failure[5] calls into question but does not rule out the role of ischemia in the pathogenesis of this condition.

J. Gary Abuelo, M.D.

Rhode Island Hospital
Providence, RI 02903
jgabuelo@lifespan.org

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Mirror Therapy for Phantom Limb Pain

TO THE EDITOR: Phantom limb pain occurs in at least 90% of limb amputees.[1] Such pain may be induced by a conflict between visual feedback and proprioceptive representations of the amputated limb.[2] Thus, illusions or imagery of movement of the amputated limb might alleviate phantom limb pain. Mirror therapy has been used with some success in patients who have had a hand or an arm amputated.[3] Since the critical component of mirror therapy may be the induction of limb imagery, we conducted a randomized, sham-controlled trial of mirror therapy versus imagery therapy involving patients with phantom limb pain after the amputation of a leg or foot.

We randomly assigned 22 patients to one of three groups: one that viewed a reflected image of their intact foot in a mirror (mirror group), one that viewed a covered mirror, and one that was trained in mental visualization. The patients were told that each therapy was being examined for efficacy, and each patient provided written informed consent. Eighteen subjects (six in each group) completed the study. Patients in the mirror group attempted to perform movements with the amputated limb while viewing the reflected image of the movement of their intact limb. Patients in the covered-mirror group attempted to perform movements with both their intact and amputated limbs when the mirror was covered by an opaque sheet. Patients in the mental-visualization group closed their eyes and imagined performing movements with their amputated limb.

Under direct observation, patients performed their assigned therapy for 15 minutes daily. They also recorded the number and duration of pain episodes and the intensity of pain with the use of a 100-mm visual-analogue scale; they also recorded the number and duration of pain episodes. The primary end point was the severity of pain after 4 weeks of therapy. Baseline scores on the visual-analogue scale were similar among the groups ($P=0.62$). Pain intensity decreased with mirror treatment (Fig. 1), as did the number and duration of pain episodes. After 4 weeks of treatment, 100% of patients in the mirror group reported a decrease in pain (median change on the visual-analogue scale, –24 mm; range, –54 to –13), but two patients had brief reactions (<2 minutes) of grief on viewing the reflected intact lower limb. In contrast, in the covered-mirror group, only one patient (17%) reported a decrease in pain, whereas three patients (50%) reported worsening pain. In the mental-visualization group, two patients (33%) reported a decrease in pain, whereas four patients (67%) reported worsening pain. In a comparison of changes in the score on the visual-analogue scale at 4 weeks, the mirror group differed

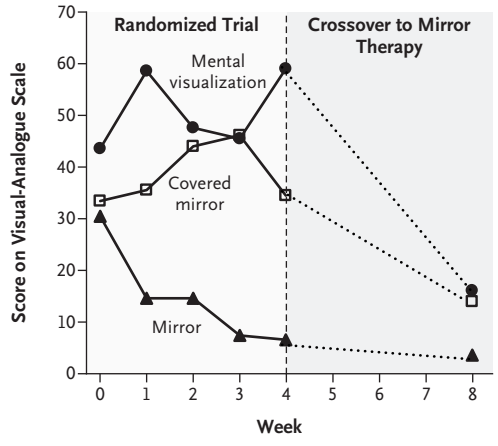

Figure 1. Changes in Phantom Limb Pain, as Measured on a 100-mm Visual-Analogue Scale.

The score on the visual-analogue scale ranges from 0 to 100, with higher scores indicating a greater severity of pain. The dotted lines represent the weeks during which patients in all three groups used to mirror therapy. Data points show medians.

significantly from both the covered-mirror group ($P=0.04$) and the mental-visualization group ($P=0.002$). Phantom limb pain decreased in eight of nine patients (89%) who switched to mirror therapy from either a covered mirror or mental visualization ($P=0.008$ for both comparisons of scores on the visual-analogue scale at 4 weeks with those at 8 weeks).

Our findings showed that mirror therapy reduced phantom limb pain in patients who had undergone amputation of lower limbs. Such pain was not reduced by either covered-mirror or mental-visualization treatment. Pain relief associated with mirror therapy may be due to the activation of mirror neurons in the hemisphere of the brain that is contralateral to the amputated limb. These neurons fire when a person either performs an action or observes another person performing an action.[4] Alternatively, visual input of what appears to be movement of the amputated limb might reduce the activity of systems that perceive protopathic pain.[5] Although the underlying mechanism accounting for the success of this therapy remains to be elucidated, these results suggest that mirror therapy may be helpful in alleviating phantom pain in an amputated lower limb.

Brenda L. Chan, B.A.
Richard Witt, P.A.-C.
Alexandra P. Charrow, B.A.
Amanda Magee, P.A.-C.
Robin Howard, M.A.
Paul F. Pasquina, M.D.

Walter Reed Army Medical Center
Washington, MD 20307

Kenneth M. Heilman, M.D.

Malcom Randall Veterans Affairs Medical Center
Gainesville, FL 32608

Jack W. Tsao, M.D., D.Phil.

Uniformed Services University of the Health Sciences
Bethesda, MD 20814
jtsao@usuhs.mil

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