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REVIEW

# Bilateral hand transplantation: Functional benefits assessment in five patients with a mean follow-up of 7.6 years (range 4–13 years)



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Received 26 May 2015; accepted 12 July 2015

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**KEYWORDS**

Bilateral hand amputee;  
Bilateral hand allotransplantation;  
Functional outcome;  
Quality of life

**Summary** Between January 2000 and July 2009, five adults who had suffered bilateral traumatic below-elbow amputations, received bilateral hand-forearm allografts performed by the Lyon team. We report the functional benefits achieved over a mean follow-up period of 7.6 years (range 4–13 years), up to December 31st, 2013. Clinical measurement is hampered by the lack of specific validated assessment tools, obliging us to use non-specific standardized evaluation means. Our assessment shows that the restoration of motion, strength, and sensibility are fair. Functional results (Carroll upper extremity function test, 400-point test, Activities of daily living) are good, as well as quality of life evaluation (RAND-36). Subjective and overall results explored with questionnaires – Disabilities of the Arm Shoulder and Hand (DASH), Hand Transplantation Score System (HTSS), are very good. Improvement was seen to continue during the first three years, and then tend to become stable. Continued efforts should be directed at designing comprehensive, condition-specific, reliable outcome measurement tools. Continuous monitoring and evaluation of patients is required to assess the long-term risk-benefit balance.

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**Introduction**

The traumatic amputation of both hands is devastating.<sup>1</sup> Bilateral hand allotransplantation is a therapeutic option,<sup>2,3</sup> but the outcomes are still under study. We report the outcomes in five consecutive patients, and identify a lack of validated specific assessment tools.

Our patients had suffered bilateral below-elbow amputations and received bilateral allografts between January 2000 and July 2009. They were followed up for a mean of 7.6 years (4–13 years), until December 31st, 2013.

**Patients and methods****Recipients**

The study includes four males and one female, mean age 26.2 years (range 21–33 years) who underwent bilateral

hand and forearm allotransplantation following trauma (Picture 1, Table 1). The interval from amputation to transplantation was 3–5 years. All were originally right-hand dominant. Four patients used myoelectric prostheses prior to allotransplantation with poor satisfaction.

**Surgery**

Details of technique have been reported.<sup>2,4,5</sup>

**Individual management requirements and complications**

Patient 2 returned to theatre at day one for subacute ischemia in the right hand; at 4 months sepsis of the left ulna required removal of the fixation and antibiotics.<sup>6</sup> Patient 3 required a right end-to-end anastomosis between radial recipient and brachial donor arteries because of arterial length difference, and debridement of skin necrosis at the tips of donor skin flaps. Patient 4 had previously suffered burn injury, and therefore underwent bone biopsy



**Picture 1** The recipients before hand transplantation.

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