



Psychosocial Outcomes after Bilateral Hand Transplantation

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Background: Since the first successful hand transplantation in 1998, there have been multiple reports about surgical technique, transplant survival, and immunosuppression. However, very limited published data exist on psychosocial outcomes following hand transplantation.

Methods: We report psychosocial outcomes in a patient with bilateral hand transplants at the midforearm level with serial follow-ups over 3.5 years. Different metrics used to study psychosocial outcomes included the following: SF-12, CES-D, Dyadic Adjustment Scale, Rosenberg SE, and EQ-5D.

Result: Preoperatively, our patient did not have any evidence of depression (CES-D = 3), had a nonstressful relationship with his spouse (Dyadic Adjustment Scale = 100), and self-esteem was in the normal range (Rosenberg SE = 21). These metrics and his additional scales (SF-12 MCS, EQ-5D, and EQ-VAS) did not change appreciably and were within the normal range for the entire duration of 3.5-year follow-up at all different time points.

Conclusion: With the increasing popularity of hand transplantation and the increasing awareness of the importance of psychosocial parameters in overall success, appropriate, comprehensive, and standardized measurements are important. These should be an integral part of patients' screening and follow-up. (*Plast Reconstr Surg Glob Open* 2015;3:e533; doi: 10.1097/GOX.0000000000000520; Published online 9 October 2015.)

Since the first successful hand transplantation in 1998,¹ multiple reports exist about surgical technique, transplant survival, and immunosuppression.²⁻⁴ However, very limited reports describe psychosocial outcomes after hand transplantation.⁵⁻¹¹ As hand transplantation becomes more popular with successful long-term survival, measurement and critical evaluation of psychosocial outcomes gain importance.

We report a combination of psychosocial metrics in our first successful patient and justify standardized measurement of psychosocial domains. We aim to establish a baseline for others to study using a common set of standardized scales.

We have performed 3 bilateral hand transplantations at our institution. Our index patient, a 68-year-old formerly left-handed man, lost all 4 limbs in 2002 due to sepsis and disseminated intravascular coagulation related to a renal stone. He underwent bilateral hand transplantation at the midforearm level on October 5, 2011.

METHODS

We describe psychosocial metrics with serial follow-ups over 3.5 years. Psychosocial self-reported measures included the following: Medical Outcomes Survey Short Form 12 (SF-12),^{12,13} Center for Epidemiological Studies Depression (CES-D),^{14,15} Dyadic

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Adjustment Scale (DAS),^{16,17} Rosenberg Self-Esteem Scale (Rosenberg SE),¹⁸ and EuroQOL 5-Dimension Questionnaires (EQ-5D).^{19,20} Preoperative social desirability was measured using Marlowe-Crowne Social Desirability Scale (MC-SDS).²¹

The SF-12 assesses 8 domains, namely general health, physical functioning, physical role, bodily pain, vitality, social functioning, emotional role, and mental health. The first 4 components constitute physical component summary (PCS), whereas the latter 4 provide mental component summary (MCS).¹² Scores range from 0 (lowest level of health) to 100 (highest level of health).¹³

The CES-D is a 20-item scale measuring depressive symptoms among general population. The CES-D employs 4-point scales ranging from “rarely or none of the time” (0 point) to “most or all of the times” (3 points). The total score ranges from 0 to 60, with increasing scores indicating increasing depressive symptom severity.¹⁴ CES-D score of >15 is indicative of depression.¹⁵

The 32-item DAS measures relationship adjustment and consists of 4 subscales: dyadic consensus, dyadic satisfaction, dyadic cohesion, and affectional expression.¹⁶ Scores range from 0–151 with higher scores reflecting a less stressful relationship with a partner.¹⁷ Scores >97 indicate “nonstressful” relationship.

The 10-item Rosenberg-SE scale assesses global self-worth by measuring both positive and negative feelings about the self. Items are answered using a 4-point Likert scale ranging from “strongly agree” to “strongly disagree.” Total scores range from 0–30. Scores <15 suggest low self-esteem.¹⁸

The EQ-5D assesses function in 5 socially relevant domains: mobility, self-care, usual activities, pain-discomfort, and anxiety-depression.¹⁹ Based on these 5 domains, an index score is derived ranging from 1 (best possible health) to –0.11 (worse than death).¹⁹ It is accompanied by a Visual Analogue Scale (VAS), which provides a self-assessment of one’s health ranging from 0 (worst imaginable health) to 100 (best imaginable health).²⁰

These measures have established reliability and validity and the selected psychosocial domains are

established as risk factors for poorer adjustment post transplantation.^{22,23} Additionally, the SF-12 and EQ-5D are widely used scales for quality of life post transplantation.^{24–26} Accordingly, this combination of standardized and validated metrics provides the technology and framework for comparisons of psychosocial outcomes.

RESULTS

Psychosocial outcomes were assessed longitudinally as shown in Table 1 and Figure 1. Preoperatively, there was no evidence of depression (CES-D = 3), a nonstressful relationship with his partner (DAS = 101), normal self-esteem (Rosenberg SE = 19), and average social desirability (MC-SDS = 11). Depressive symptom scores fluctuated but remained well below the clinical cut-off for depression. Similarly, relationship adjustment scores fluctuated but, with the exception of 6 weeks post operation, were within the normal range for the 3.5-year follow-up. The SF-12 MCS was often slightly higher than US norms, and the EQ-5D and EQ-VAS scores were generally stable for the duration of the follow-up. The SF-12 PCS scores worsened at 6 weeks post operation, consistent with broad transplantation findings²⁵ of increased disability and dependence during early surgical recovery, and continued to fluctuate around the baseline over the 3.5-year follow-up.

DISCUSSION

We describe multiple psychosocial outcome metrics and serial long-term follow-up in our first successful patient. To evaluate psychosocial outcomes, we included empirically based risk factors and indicators such as self-esteem, relation with partner, depressive symptoms, and health-related quality of life. These assessments capture a broad cross-section of patients’ psychosocial functioning while being manageable to administer and minimize patient response burden.

Although there are defined parameters for psychological screening of candidates being considered for hand transplant,^{27–29} there is dearth of literature about psychosocial outcomes following

Table 1. Psychosocial Outcomes Using Standardized Parameters in a Patient with Bilateral Hand Transplantation at the Midforearm Level with Comparison to the Preoperative State

	Preoperation	6 weeks	3 months	6 months	1 year	1.5 years	2 years	2.5 years	3 years	3.5 years
SF-12 PCS	44.7	26.6	31.79	35.18	41.3	29.22	47.77	35.9	33.79	43
SF-12 MCS	52.26	54.8	57.1	48.29	61.5	59.82	50.87	59.8	52.15	50.3
CES-D	3	6	5	9	9	6	9	8	7	10
DAS	101	88	110	105	107	99	103	100	—	100
Rosenberg SE	19	21	19	20	20	19	20	20	18	18
EQ-5D	0.689	0.380	0.689	0.689	0.463	0.689	0.742	0.742	0.689	0.742
EQ-VAS	90	70	85	70	85	75	80	85	80	78

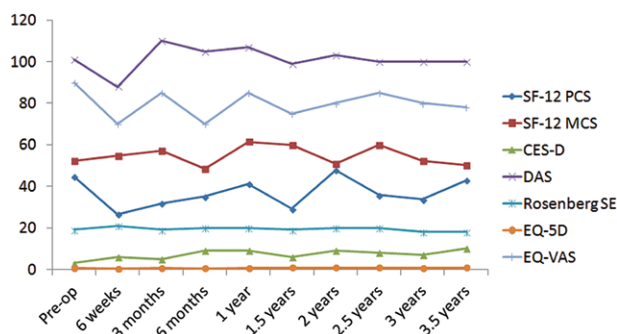


Fig. 1. Graphical representation of psychosocial outcomes using standardized parameters in a patient with bilateral hand transplantation at the midforearm level with comparison to the preoperative state.

transplant.⁸⁻¹¹ Several studies report improved psychosocial outcomes following hand transplantation but such assessment is generally based on personal interviews with patients.⁹⁻¹¹

Our findings show that multiple aspects of psychosocial outcomes were largely within normal ranges preoperatively and throughout the postoperative course. There was no apparent sustained improvement among the measured parameters and, consistent with extant transplant literature, a slight transient worsening of well-being in the immediate 6-week postoperative period. These remarkably stable findings may be explained by several possibilities. First, stability in scores may reflect inherent selection bias while considering patients for hand transplantation. Our index patient was well-compensated, both functionally and psychologically, functioning quite independently with prosthesis and with very stable social support. Although this made him an ideal transplantation candidate, it left little room for psychosocial improvement post transplantation. Second, it is possible for patients to falsely improve their scores preoperatively to appear a better candidate for selection. However, the average score on social desirability scale makes it an unlikely possibility in our patient. Third, the extensive follow-up and rehabilitation needed for first few years post transplantation may contribute to limited psychosocial improvement. Patients might have improved objective psychosocial outcomes 5 to 10 years after transplant when follow-up visits are less frequent and their social readjustment is complete.

CONCLUSIONS

With the increasing popularity of hand transplantation and the importance of truly improving our patients' lives, standardized psychosocial evaluation is an increasingly important part of transplant evaluation. Acknowledging the limitations of data from a single

patient, we feel that additional research and increased sample size are needed. However, the psychosocial domains evaluated were chosen based on existing transplant literature and standardized and validated metrics should be an integral part of patients' screening and follow-up after hand transplantation.

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