# The Effect of Decentralization in Digital Replantation: A Study of the National Inpatient Sample

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## Introduction

Recent reports suggest a decrease in success rates in digital replantation in the United States. We hypothesize that this may be occurring due to the decentralization of replantations away from centers of excellence.

## Methods

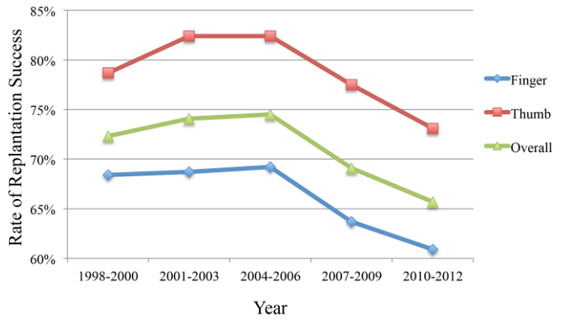
All amputation injuries and digital replantations captured by the National Inpatient Sample during 1998-2012 were identified. Procedures were characterized as occurring at high volume hospitals (>20 replants per year) versus low volume hospitals, and as being performed by high volume surgeons (>5 replants per year) versus low volume surgeons. A successful procedure was defined as one in which a replantation occurred without a subsequent revision amputation. Hospital and surgeon volume were tested for association with both the year of procedure and the success of the procedure.

## Results

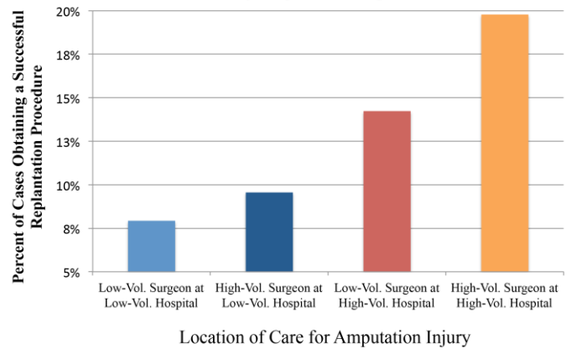
101,693 amputation injuries resulting in 15,821 replantations were identified. The overall rate of success of replantations dropped from 74.5% during 2004-06 to 65.7% during 2010-12 ($p<0.001$). The percentage of high volume centers decreased from 15.5% during 2004-06 to 8.9% during 2007-09 ($p<0.001$). Similarly, the percentage of high volume surgeons decreased from 14.4% during 1998-2000 to 2.6% during 2007-09 ($p<0.001$). High volume surgeons had a higher rate of success than low volume surgeons (79.3% versus 72.2%; $p<0.001$). Similarly, high volume hospitals had a higher rate of success than low volume hospitals (77.1% versus 70.9%; $p<0.001$). High volume surgeons operating at high volumehospitals had higher success rates than low volume surgeons operating at low volume hospitals (92.0% versus 72.1%; $p<0.001$). In addition, high volume surgeons operating at high volume hospitals attempted replantations at greater rates than low volume surgeons operating at low volume centers (21.5% vs 11.0%; $p<0.001$). Overall, an amputation injury presenting to a high volume surgeon at a high volume center had a 2.5 times greater likelihood of obtaining a successful replantation than a low volume surgeon at a low volume hospital.

## Figures

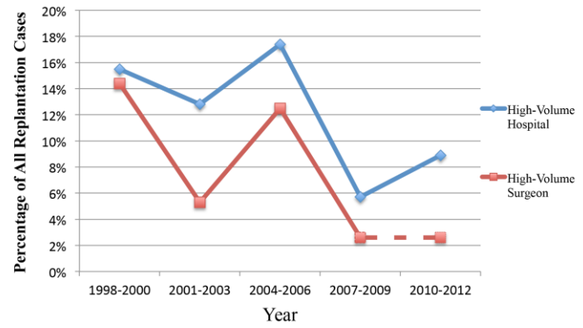
**Replant Success Rates in the United States**



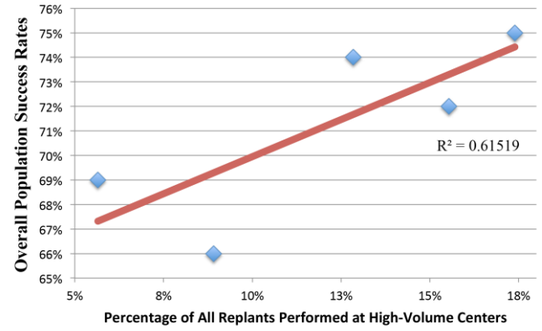

**Percentage of Cases Obtaining a Successful Replantation Procedure by Hospital and Surgeon Volume**




**Percentage of National Cases being Performed at High-Volume Hospitals and by High-Volume Surgeons**




**Correlation between Percentage of Cases Performed at High-Volume Hospitals and Overall Success Rates**




## Conclusions

These data suggest that one possible reason for decreased success rates of digital replantation in the United States is the decentralization of digital replantation away from high volume surgeons at high volume centers. The establishment of national centers of excellence for digital replantation referral may increase overall replantation success rates in the United States.