



Cross-cultural variation in preference for replantation or revision amputation: Societal and surgeon views



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ABSTRACT

Treatment decisions after an injury like finger amputation are made based on injury and patient factors. However, decisions can also be influenced by provider and patient preferences. We compared hand surgeon and societal preferences and attitudes regarding finger amputation treatment in Japan and the US. We performed a cross-sectional survey with subjects derived from large tertiary care academic institutions in the US and Japan. We secured 100% participation of American hand surgeon members of the Finger Replantation and Amputation Multicenter Study and presenting hand surgeons at the 32nd Annual meeting of the Central Japanese Society for Surgery of the Hand. Societal preferences were gathered from volunteers at the 2 universities in the US and Japan. There were no significant differences in estimations of function, sensation, or appearance after replantation; American and Japanese societal participants preferred replantation compared to surgeons, although this was more pronounced in Japan. The Japanese society displayed more negative attitudes toward finger amputees than did Japanese surgeons. American respondents anticipated more public stigmatisation of amputees than did American surgeons. Societal preference for replantation was not caused by inflated expectations of outcomes after replantation. Japanese societal preference was likely driven by negative views of finger amputees. American society noted no decrease in physical health after amputation, but did note a quality of life decrease attributed to public stigmatisation. Japanese society and surgeons had a stronger preference for replantation than American society and surgeons, possibly attributed to cultural differences.

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Introduction

Finger amputations are one of the most common traumatic hand injuries that present to the emergency department, with an estimated 11,000 injuries annually [1]. They are also costly, with previous studies estimating costs up to \$23,000 per injury [2–5]. These injuries are most commonly treated with revision and closure of the amputation stump or replantation of the digit. General guidelines indicate that replantation should be attempted in cases of thumb amputation, multiple digit amputation, and all amputation injuries in children [6]. Additionally, the decision to replant or revise depends upon injury characteristics (e.g. zone of

amputation, mechanism of injury, which digit is affected, or the number of affected digits) and patient factors (e.g. age, comorbidities, or smoking status) [6]. Patient and provider preference can play a role as well. Patients may opt for revision amputation because this procedure can be performed expediently in the emergency department and return patients to work more quickly [7]. Providers may also favour revision amputation because it can be performed relatively easily in an outpatient setting without the need for intricate microvascular expertise, and does not require the operating room time and staff support for replantation.

Given all of the above factors, replantation is attempted in only 14% of US patients with an amputation injury [8–10]. In fact, replantation is performed at only 15% of American hospitals, with the majority of these hospitals performing fewer than 10 operations per year [8,10]. This is in contrast to much of Asia, including Japan, where replantation is attempted for as many as 29% of amputation injuries [11]. Increased use could be due to higher reimbursement in Japan compared to the US [12], but also may be attributed to broader indications for replantation, possibly owing

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to cultural differences [13–15]. The Japanese may be more concerned over the appearance of their hand and have stronger body integrity beliefs compared to Americans [16]. Shared cultural influences in Japan may align patient and physician preferences, resulting in a higher rate of replantation.

For complex amputation injuries that have no clear treatment guidelines, the decision is jointly made by the surgeon and the patient. It is important that physicians and patients understand each other's attitudes and preferences towards finger replantation because discrepancies in these intangible factors can lead to dissatisfaction with care and poor treatment adherence. The purpose of this study is to compare societal and hand surgeon attitudes towards finger replantation compared to revision amputation in the US and in Japan. We hypothesised that in both the US and Japan, the general population will estimate greater function and sensation of replanted digits, will be more in favour of replantation over revision amputation, and have a greater stigma towards finger amputees than surgeons. We further hypothesised that Japanese societal and surgeon preferences will be more similar than US societal and surgeon preferences will be due to more tightly held cultural values in Japan than in the US.

Materials and methods

Sample

Hand surgeons from the Finger Replantation and Amputation Multicenter (FRAM) Study were recruited for the American surgeon survey. The FRAM Study is a prospective outcomes study, conducted by the Plastic Surgery Foundation (PSF), of patients with traumatic finger and thumb amputation injuries treated with revision amputation and replantation. There are 15 study sites, each of which is a leading hand trauma centre in their region. The surgeons at each of these sites (approximately 2 per site) are experienced in treating hand injuries, specifically finger amputations. Participants were recruited via an email sent by PSF with a link to the online survey. Hand surgeons at the 32nd Annual meeting of the Central Japanese Society for Surgery of the Hand were recruited for the Japanese surgeon survey. This society has held annual meetings since 1984 and is one of the largest societies for hand surgeons in Japan. Members are leaders in the fields of hand or orthopaedic surgery and microsurgery. Prior to the meeting, surveys were given to surgeons scheduled to make podium presentations.

Members of the general population were recruited from two large university hospitals (one in the Midwestern US and one in Western Japan). Participants had to be 18 years of age or older and be able to read and complete the survey in English or Japanese. Individuals with previous or current hand injuries or conditions that affected the movement or sensation of the fingers, hands, or wrists (e.g. arthritis, amputation, severe burn, neurologic conditions) were ineligible. Flyers with the online survey address were placed throughout the hospital and medical school complexes, and paper copies of the survey (to be returned to a receptionist) were placed in clinical waiting rooms at local outpatient clinics. The study was also posted on an online site that allows people interested in participating in research to search for a study, as well as allowing researchers to search for possible participants.

Questionnaire

The societal survey measured preference for replantation versus revision amputation and the importance of various factors in determining that preference. The surgeon survey queried educational experience and experience with replantation and presented various finger amputation injury scenarios for surgeons

to choose a treatment. Questions regarding replantation and revision amputation outcomes, attitudes about body integrity, and stigma toward finger amputees were identical in both versions and thus can be directly compared. (Appendix) Respondents were asked to estimate function, appearance, and sensation 6 months after replantation and 6 months after revision amputation. Body integrity attitudes were measured via level of agreement with statements of pertaining to Confucian beliefs about the completeness of the human body. Finally, respondents were asked about their own attitudes about finger amputees and to estimate stigmatisation by others. No validated questionnaire about stigma towards amputees exists, so we selected questions from the Neuro-QOL Ability to Participate in Social Roles and Activities short form, the Neuro-QOL Stigma short form, and the Amputee Body-Image Scale (ABIS) [17–20]. These surveys are validated to be self-administered by patients regarding their own experiences. We modified questions so that select items would be in relation to others. For example, the ABIS questions, “My amputation makes me think of myself as disabled” and “People treat me as disabled” were combined and altered to “People with a single finger amputation are disabled.” Previous studies have used a similar method for adaption to specific conditions [21,22].

Translation was done using the standard “translation, back translation” method to ensure question equivalence in each language. The surveys were written in English by a native English speaker and a native Japanese speaker. They were then translated to Japanese, and subsequently translated back to English by two different native Japanese speakers. The two English surveys were compared by a native English speaker not involved with the project to ensure the questions had the same meaning. Prior to translation, the English surveys were pilot tested by house officers and staff at the US hospital. Recommendations for readability, relevance of questions, and technical issues were sought and changes made as necessary.

Analysis

All responses were recorded on 5-point Likert scales. General population and surgeon estimates were compared using Wilcoxon–Mann–Whitney test with role (society or surgeon) as the independent variable and ordinal Likert scale response as the dependent variables. Statistical significance was set at $p < 0.05$.

Results

100% of the surgeons contacted completed surveys, resulting in 32 surveys by US surgeons and 34 surveys by Japanese surgeons. We enrolled 49 US participants and 81 Japanese participants to complete the societal survey. Age distribution did not differ significantly between American and Japanese general population or surgeons or when the population and surgeons were compared by country. Mean age for all groups ranged between 41 and 46 years. Societal respondents from both the US and Japan were significantly more likely to be female (US: 71% vs 16%; $p < 0.0001$, Japan: 43% vs 3%; $p < 0.0001$).

US surgeons vs society

Surgeons and the general population agreed in their estimates of outcomes for a replanted digit 6 months after replantation. (Table 1) There were no significant differences in assessment of appearance, with both samples estimating better appearance after replantation than after revision amputation. The US general population was more likely to strongly agree or agree with the statement “finger replantation should always be attempted” (24% vs 13%; $p = 0.0006$) compared to US surgeons. (Table 2) Both groups

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