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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 stigmatization 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 stigmatization. Japanese society and surgeons had a stronger

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preference for replantation than American society and surgeons, possibly attributed to cultural differences.

Keywords

finger replantation; surgeon preference; societal preference; cross-cultural difference

Introduction

Finger amputations are one of the most common traumatic hand injuries that present to the emergency department, with an estimated 11,000 injuries annually¹. They are also costly, with previous studies estimating costs up to \$23,000 per injury²⁻⁵. 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 children⁶. 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 quickly⁷. Providers may also favor 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 injury⁸⁻¹⁰. 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 injuries¹¹. Increased use could be due to higher reimbursement in Japan compared to the US¹², but also may be attributed to broader indications for replantation, possibly owing to cultural differences¹³⁻¹⁵. The Japanese may be more concerned over the appearance of their hand and have stronger body integrity beliefs compared to Americans¹⁶. 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 hypothesized that in both the US and Japan, the general population will estimate greater function and sensation of replanted digits, will be more in favor of replantation over revision amputation, and have a greater stigma towards finger amputees than surgeons. We further hypothesized 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 center 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 stigmatization 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 disagreed with the statement “all patients prefer replantation over revision amputation.” The groups disagreed on estimated outcomes 6 months after revision amputation. Surgeons estimated significantly better function (94% excellent/very good/good vs 82%, $p = 0.01$) and sensation (91% vs 53%, $p < 0.0001$) compared to societal estimates.

There were no significant differences between societal and surgeon attitudes regarding body integrity. There were also no significant differences in attitudes about amputees' abilities to work, socialize, or care of themselves. (Table 3) Surgeons, however, were significantly more likely to disagree or strongly disagree that finger amputees are disabled (91% vs 69%; $p=0.05$). Regarding stigmatization by others, participants were more likely to say single finger amputees may be avoided (18% strongly agree/agree vs 6%; $p=0.05$) or treated unkindly (41% vs 9%; $p=0.007$) than surgeons.

Japan Surgeons vs Society

Members of the general population anticipated worse appearance 6 months after replantation than did surgeons (29% fair/poor vs 6%; $p=0.04$). (Table 1) The general population was also significantly more likely to endorse statements of replantation preference, strongly agreeing or agreeing that finger replantation should always be attempted (43% vs 21%; $p=0.0009$) and that all patients prefer replantation (43% vs 21%, $p<0.0001$). Societal estimates of function (67% vs 24%; $p<0.0001$) and sensation (70% vs 32%; $p=0.0004$) 6 months after revision amputation were worse than those of surgeons.

Societal attitudes regarding body integrity were stronger than surgeons' as well. Societal respondents were significantly more likely to strongly agree or agree with the statements "one's body must be safeguarded" (54% vs 15%, $p<0.0001$) and "if one is born with a complete body, one should die with a complete body" (30% vs 0%, $p<0.0001$). Japanese surgeons were significantly more likely to strongly disagree or disagree that finger amputees cannot keep up with work (94% vs 57%, $p<0.0001$) or take care of themselves (100% vs 76%, $p=0.004$) compared to the Japanese general population. There were no significant differences regarding stigmatization by others.

US vs Japan

Estimations of function and sensation after replantation were similar among all four groups (US society, US surgeons, Japanese society, Japanese surgeons). Japanese society estimated a poorer hand appearance after replantation than did other groups. They also believed that all patients preferred replantation, which was also contrary to Japanese surgeons and American surgeons and society. When asked if replantation should always be attempted, US surgeons were more likely to disagree than the other groups. Japanese society held the strongest beliefs about body integrity. When asked about attitudes and stigma toward amputees, US surgeons were the only group to not see finger amputees as disabled, and they also anticipated no social stigma.

Discussion

Our first hypothesis, that the general population estimates greater function and sensation of replanted digits, was rejected. Despite the obvious differences in experience with replantation, societal and surgeon estimates of function and sensation were similar. Both groups estimated these outcomes to be good or fair 6 months after replantation. This held true in the US and in Japan and indicates that the general public's preference for replantation is not based on unrealistic ideas about exceptional recovery of digit function or sensation

after replantation. Our second hypothesis, that society favors replantation compared to surgeons, showed mixed results. US participants were more likely to agree that replantation should be attempted in all cases, but displayed an understanding, shared by surgeons, that not all patients want replantation. Japanese participants were also more likely to agree that replantation should be attempted in all cases. These participants also indicated that all patients prefer replantation whereas the majority of surgeons disagreed. The differing views on replantation between the Japanese general population and Japanese surgeons may be caused by stronger cultural beliefs held by the general population. The teachings of Confucius say that one's body must be safeguarded so if one is born with a whole body they must die with a whole body¹⁶. This belief may differ among surgeons who, after going through medical training and witnessing injuries and disease, may have developed a more pragmatic view. There is also a notorious criminal organization in Japan, called the Yakuza, that has a ritual of self-amputation of the small finger to show remorse after making a mistake. Someone with a traumatic defect to the small finger may be presumed to be involved in criminal activity.²³ This creates additional stigma around having an amputated finger. Our final hypothesis, that the general population held greater stigma towards finger amputees than surgeons, was partially supported. Japanese participants endorsed more stigmatizing attitudes than Japanese surgeons, but participants did not anticipate any more societal stigma. In the US, neither participants nor surgeons displayed stigma toward amputees. However, participants estimated that others would avoid or be unkind to amputees.

Overall, society preferred replantation more than surgeons. Japanese society strongly preferred replantation, in addition to holding stronger beliefs about body integrity, which means that Japanese societal preference for replantation is almost ubiquitous. Overall, no group held especially negative attitudes toward single finger amputees. There were some important differences though. American participants were more likely than surgeons to anticipate societal stigma (in the form of avoidance and treating the amputee unkindly). This may be why there was a stronger American societal preference for replantation despite the knowledge that replantation does not necessarily provide better functional outcomes or higher performance on activities of daily living over revision amputation. The societal view of single finger amputation in the US is that of unchanged physical health, but decreased quality of life.

Understanding differences in patient and surgeon preferences better enables physicians to discuss treatment options with patients. Patients are more likely than physicians to rank higher quality of life as preferred outcomes over immediate symptom relief. Furthermore, patients are more likely to risk complications or shortened length of life in exchange for higher quality of life²⁴⁻²⁶. Providers may also tend to underestimate the quality of life effects of lasting sequelae. For example, a study examining patient and surgeon views on symptoms, function, and the impact of ankle osteoarthritis on daily life determined that surgeons underestimated the impact that the condition had on a patient's daily life. Patients reported that they were hindered when performing daily chores, standing still was difficult, and they often felt that their ankle was unstable. Physicians, on the other hand, recognized acute symptoms such as pain but underappreciated how these symptoms impacted patients' lives, such as their ability to jump²⁷. In another study, Chung et al. reported on amputation

versus reconstruction after open tibial fractures, and found that both patients and physicians prefer reconstruction over amputation. However, patients estimated a lower quality of life after amputation than physicians²⁸. In this case, although both providers and patients valued the same outcome, physicians appeared to be overestimating the quality of life associated with it. This supports our finding that US surgeons anticipate no societal stigma towards amputees.

Our 100% response rate from surgeons, impressive because surgeons are notoriously poor survey respondents, is likely not nationally representative. Participating surgeons work at top centers for hand surgery and have extensive training and experience. Preferences and attitudes of less experienced surgeons may differ. Surveying a more general selection of hand surgeons for the US surgeon group, such as members of the American Society for Surgery of the Hand, may have increased the generalizability of our results. Surgeons not involved in the FRAM Study may actually prefer amputation over replantation. Despite this we believe that having the opinions of the leaders in hand surgery is beneficial, given that these surgeons are the ones who are more likely to perform complicated microsurgical procedures such as digit replantation. Likewise, societal preferences were gathered from a geographically limited population visiting one of two large research medical centers. This population includes patients and visitors, but also consists of students and staff. It may not be representative of people who are more likely to have an amputation, such as those who perform manual labor. This group, who may place more value on the use and functionality of their hands, may have different views on replantation versus revision amputation. A final consideration is that our study examined societal preferences while much of the literature focuses on patient preference. The public may underestimate the ability to adapt to a disability or illness, which would influence their treatment preference²⁹. However, in a study on the utility of hand transplantation versus hand amputation, the general public had similar views on quality of life as did hand amputees³⁰. A meta-analysis comparing patient and societal preferences also demonstrated that there were no differences in patients' preference of their actual health states versus populations' preference of the same, hypothetical health state, so we are confident that such comparisons in our study are valid³¹.

Patients prefer to use a shared decision making model, but in emotional situations where patients have to make a decision quickly, they may defer to the physician's preference³². In the US, where societal preference is for replantation whereas hand surgeons prefer to treat with revision amputation, this may result in patients not getting their preferred treatment. US physicians follow stricter indications for replantation attempts and may further avoid performing replantation due to low reimbursement, lack of a microsurgical support team, a busy elective surgery schedule, and disappointment in results¹⁰. In contrast, Japanese surgeons benefit from better reimbursement, more resources, and more access to specialized physicians making replantation a more readily available choice³³. Because of the potential patient/provider disagreement, clear, evidence-based guidelines need to be created to assist providers and patients in choosing the most appropriate treatment, keeping in mind that even under ideal circumstances, a limited percentage of finger amputation injuries are amenable to replantation attempt. The Finger Replantation and Amputation Challenges Study intends to do this by determining what type of patient and/or injury benefits the most from replantation versus revision amputation. Projects done by this study group will provide

evidence to standardize treatment decision-making in amputation injuries taking into account both patient and provider concerns and expectations as well as objective injury factors, leading to optimal treatment for patients who present with a finger amputation injury.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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References

1. Dillingham TR, Pezzin LE, MacKenzie EJ. Limb amputation and limb deficiency: epidemiology and recent trends in the United States. *Southern Medical Journal*. 2002; 95:875–883. [PubMed: 12190225]
2. Chung KC, Shauver MJ. Table saw injuries: epidemiology and a proposal for preventive measures. *Plast Reconstr Surg*. 2013; 132:777e–783e. [PubMed: 24076669]
3. Hoxie SC, Capo JA, Dennison DG, Shin AY. The economic impact of electric saw injuries to the hand. *J Hand Surg Am*. 2009; 34:886–889. [PubMed: 19410992]
4. Sears ED, Shin R, Prosser LA, Chung KC. Economic analysis of revision amputation and replantation treatment of finger amputation injuries. *Plast Reconstr Surg*. 2014; 133:827–840. [PubMed: 24352209]
5. Conner KA, McKenzie LB, Xiang H, Smith GA. Pediatric traumatic amputations and hospital resource utilization in the United States, 2003. *J Trauma*. 2010; 68:131–137. [PubMed: 20065768]
6. Mulders MA, Neuhaus V, Becker SJ, Lee SG, Ring DC. Replantation and revascularization vs. amputation in injured digits. *Hand (N Y)*. 2013; 8:267–273. [PubMed: 24426933]
7. Ozer K, Kramer W, Gillani S, Williams A, Smith W. Replantation versus revision of amputated fingers in patients air-transported to a level 1 trauma center. *J Hand Surg Br*. 2010; 35:936–940.
8. Chung KC, Kowalski CP, Walters MR. Finger replantation in the United States: rates and resource use from the 1996 Healthcare Cost and Utilization Project. *J Hand Surg Am*. 2000; 25:1038–1042. [PubMed: 11119660]
9. Friedrich JB, Poppler LH, Mack CD, Rivara FP, Levin LS, Klein MB. Epidemiology of upper extremity replantation surgery in the United States. *J Hand Surg Am*. 2011; 36:1835–1840. [PubMed: 21975098]
10. Payatakes AH, Zagoreos NP, Fedorcik GG, Ruch DS, Levin LS. Current practice of microsurgery by members of the American Society for Surgery of the Hand. *J Hand Surg Am*. 2007; 32:541–547. [PubMed: 17398366]
11. Epidemiology of traumatic finger amputation in Japan. 2014 <http://caloo.jp/dpc/code/160640>.
12. Bean JR. National healthcare spending in the U.S. and Japan: national economic policy and implications for neurosurgery. *Neurol Med Chir (Tokyo)*. 2005; 45:18–24. [PubMed: 15699616]
13. Ito H, Sasaki K, Morioka K, Nozaki M. Fingertip amputation salvage on arterial anastomosis alone: an investigation of its limitations. *Ann Plast Surg*. 2010; 65:302–305. [PubMed: 20733365]
14. Koshima I. Atypical arteriole anastomoses for fingertip replantations under digital block. *J Plast Reconstr Aesthet Surg*. 2008; 61:84–87. [PubMed: 18068656]

15. Yoshimatsu H, Yamamoto T, Seki Y, Narushima M, Iida T, Koshima I. A new device expanding operability of fingertip replantation: subzone 1 fingertip replantation assisted by non-enhanced angiography in a 2-year-old boy. *J Plast Reconstr Aesthet Surg*. 2012; 65:1592–1594. [PubMed: 22512940]
16. Tai MC. An Asian perspective on organ transplantation. *Wien Med Wochenschr*. 2009; 159:452–456. [PubMed: 19823791]
17. Breakey JW. Body image: The lower-limb amputee. *J Prosthet Orthot*. 1997; 9:58–66.
18. Gershon RC, Lai JS, Bode R, Choi S, Moy C, Bleck T, et al. Neuro-QOL: quality of life item banks for adults with neurological disorders: item development and calibrations based upon clinical and general population testing. *Qual Life Res*. 2012; 21:475–486. [PubMed: 21874314]
19. Saetermoe CL, Scattone D, Kim KH. Ethnicity and the stigma of disabilities. *Psychol Health*. 2001; 16:699–713.
20. Somervill JW, Cordoba ON, Abbott RS, Brown PF. The origins of stigma: reactions by male and female pre-school children to a leg amputation. *Am Correct Ther J*. 1982; 36:14–17. [PubMed: 6211069]
21. Hagstromer M, Bergman P, De Bourdeaudhuij I, Ortega FB, Ruiz JR, Manios Y, et al. Concurrent validity of a modified version of the International Physical Activity Questionnaire (IPAQ-A) in European adolescents: The HELENA Study. *Int J Obesity*. 2008; 32(Suppl 5):S42–S48.
22. Lewis JE, Hilditch JR, Wong CJ. Further psychometric property development of the Menopause-Specific Quality of Life questionnaire and development of a modified version, MENQOL-Intervention questionnaire. *Maturitas*. 2005; 50:209–221. [PubMed: 15734602]
23. Bosmia AN, Griessenauer CJ, Tubbs RS. Yubitsume: ritualistic self-amputation of proximal digits among the Yakuza. *J Inj Violence Res*. 2014; 6:54–56. [PubMed: 24284812]
24. Cavaliere CM, Chung KC. A cost-utility analysis of nonsurgical management, total wrist arthroplasty, and total wrist arthrodesis in rheumatoid arthritis. *J Hand Surg Am*. 2010; 35:379–391. e2. [PubMed: 20193858]
25. Emberton M. Medical treatment of benign prostatic hyperplasia: physician and patient preferences and satisfaction. *Int J Clin Pract*. 2010; 64:1425–1435. [PubMed: 20579137]
26. Gu NY, Wolf C, Leopold S, Manner PA, Doctor JN. A comparison of physician and patient time trade-offs for postoperative hip outcomes. *Value Health*. 2009; 12:618–620. [PubMed: 18980636]
27. Witteveen AG, Hofstad CJ, Breslau MJ, Blankevoort L, Kerkhoffs GM. The impact of ankle osteoarthritis. The difference of opinion between patient and orthopedic surgeon. *Foot Ankle Surg*. 2014; 20:241–247. [PubMed: 25457659]
28. Chung KC, Shauver MJ, Saddawi-Konefka D, Haase SC. A decision analysis of amputation versus reconstruction for severe open tibial fracture from the physician and patient perspectives. *Ann Plast Surg*. 2011; 66:185–191. [PubMed: 20842003]
29. Ubel PA, Loewenstein G, Jepson C. Whose quality of life? A commentary exploring discrepancies between health state evaluations of patients and the general public. *Qual Life Res*. 2003; 12:599–607. [PubMed: 14516169]
30. Alolabi N, Chuback J, Grad S, Thoma A. The utility of hand transplantation in hand amputee patients. *J Hand Surg Am*. 2015; 40:8–14. [PubMed: 25534832]
31. Dolders MG, Zeegers MP, Groot W, Ament A. A meta-analysis demonstrates no significant differences between patient and population preferences. *J Clin Epidemiol*. 2006; 59:653–664. [PubMed: 16765267]
32. Hack TF, Degner LF, Watson P, Sinha L. Do patients benefit from participating in medical decision making? Longitudinal follow-up of women with breast cancer. *Psycho-oncology*. 2006; 15:9–19. [PubMed: 15669023]
33. Tsuda T, Aoyama H, Froom J. Primary health care in Japan and the United States. *Soc Sci Med*. 1994; 38:489–495. [PubMed: 8184312]

Table 1

Recovery estimates 6 months after injury

United States										Japan					
Replantation (%)					Revision Amputation (%)			Replantation (%)			Revision Amputation (%)				
	Society	Surgeons	p-value	Society	Surgeons	p-value	Society	Surgeons	p-value	Society	Surgeons	p-value	Society	Surgeons	p-value
Hand function	excellent	4.1%	0.0%	8.2%	18.8%	0.01	14.3%	0.0%	0.51	3.2%	14.7%	<0.0001			
	very good	24.5%	15.6%	36.7%	53.1%		7.9%	17.6%		7.9%	32.4%				
	good	36.7%	37.5%	36.7%	21.9%		22.2%	41.2%		22.2%	29.4%				
	fair	32.7%	37.5%	18.4%	12.5%		36.5%	29.4%		44.4%	20.6%				
	poor	2.0%	9.4%	0.0%	0.0%		19.0%	11.8%		22.2%	2.9%				
Finger/stump sensation	excellent	0.0%	3.1%	6.1%	12.5%	0.0001	7.9%	0.0%	0.99	4.8%	5.9%	0.0004			
	very good	16.3%	9.4%	10.2%	40.6%		7.9%	2.9%		0.0%	14.7%				
	good	44.9%	31.3%	36.7%	37.5%		15.9%	26.5%		25.4%	47.1%				
	fair	30.6%	43.8%	34.7%	6.3%		42.9%	55.9%		46.0%	26.5%				
	poor	8.2%	12.5%	12.2%	3.1%		25.4%	14.7%		23.8%	5.9%				
Hand appearance	excellent	12.2%	12.5%	2.0%	0.0%	0.34	14.3%	20.6%	0.04	1.6%	0.0%	0.87			
	very good	49.0%	53.1%	24.5%	15.6%		28.6%	41.2%		3.2%	0.0%				
	good	34.7%	25.0%	30.6%	37.5%		28.6%	32.4%		7.9%	8.8%				
	fair	4.1%	9.4%	36.7%	34.4%		27.0%	5.9%		25.4%	29.4%				
	poor	0.0%	0.0%	6.1%	12.5%		1.6%	0.0%		61.9%	61.8%				

Bolded values indicate statistical significance.

Table 2

Attitudes about preference and body integrity

	United States			Japan		
	Society	Surgeons	p-value	Society	Surgeons	p-value
Finger replantation should always be attempted						
strongly agree	2.0%	3.1%	0.0006	14.3%	0.0%	0.0009
agree	22.4%	9.4%		28.6%	20.6%	
neither	26.5%	9.4%		41.3%	38.2%	
disagree	40.8%	12.5%		12.7%	26.5%	
strongly disagree	8.2%	50.0%		3.2%	14.7%	
All patients prefer replantation over revision amputation						
strongly agree	2.0%	6.3%	0.59	9.5%	0.0%	<0.0001
agree	14.3%	9.4%		33.3%	20.6%	
neither	20.4%	15.6%		49.2%	17.6%	
disagree	46.9%	46.9%		6.3%	44.1%	
strongly disagree	16.3%	21.9%		1.6%	17.6%	
One's body must be safeguarded						
strongly agree	2.0%	9.4%	0.14	7.9%	2.9%	<0.0001
agree	6.1%	9.4%		46.0%	11.8%	
neither	28.6%	28.1%		42.9%	67.6%	
disagree	20.4%	25.0%		3.2%	8.8%	
strongly disagree	42.9%	28.1%		0.0%	8.8%	
If one is born with a whole body, one should die with whole body						
strongly agree	2.0%	0.0%	0.27	6.3%	0.0%	<0.0001
agree	0.0%	3.1%		23.8%	0.0%	
neither	16.3%	18.8%		44.4%	41.2%	
disagree	26.5%	37.5%		25.4%	35.3%	
strongly disagree	55.1%	40.6%		0.0%	23.5%	

Bolded values indicate statistical significance

Attitudes about amputees and stigmatization

Table 3

	United States			Japan		
	Society	Surgeons	p-value	Society	Surgeons	p-value
People with a single finger amputation cannot... keep up with work			0.40			<0.0001
strongly agree	0.0%	0.0%		4.8%	0.0%	
agree	0.0%	6.3%		3.2%	0.0%	
neither	10.2%	3.1%		34.9%	5.9%	
disagree	44.9%	34.4%		33.3%	38.2%	
strongly disagree	44.9%	56.3%		23.8%	55.9%	
socialize with friends			0.63			0.19
strongly agree	0.0%	0.0%		1.6%	0.0%	
agree	0.0%	0.0%		4.8%	2.9%	
neither	0.0%	0.0%		11.1%	2.9%	
disagree	20.4%	25.0%		31.7%	32.4%	
strongly disagree	79.6%	75.0%		50.8%	61.8%	
take care of themselves			0.74			0.004
strongly agree	0.0%	0.0%		3.2%	0.0%	
agree	0.0%	0.0%		3.2%	0.0%	
neither	0.0%	3.1%		17.5%	0.0%	
disagree	16.3%	15.6%		41.3%	41.2%	
strongly disagree	83.7%	81.3%		34.9%	58.8%	
People with a single finger amputation are... less attractive			0.68			0.31
strongly agree	0.0%	0.0%		4.8%	0.0%	
agree	0.0%	0.0%		1.6%	0.0%	
neither	10.2%	18.8%		9.5%	2.9%	
disagree	24.5%	28.1%		28.6%	35.3%	
strongly disagree	59.2%	53.1%		55.6%	61.8%	
less employable			0.93			0.59
strongly agree	0.0%	0.0%		7.9%	5.9%	
agree	2.0%	6.3%		17.5%	14.7%	

	United States				Japan			
	Society	Surgeons	p-value		Society	Surgeons	p-value	
avoided by some people	neither	8.2%	6.3%		27.0%	44.1%		
	disagree	42.9%	37.5%		23.8%	17.6%		
	strongly disagree	46.9%	50.0%		23.8%	17.6%		
				0.05				0.97
treated unkindly by some people	strongly agree	0.0%	3.1%		7.9%	0.0%		
	agree	18.4%	3.1%		9.5%	11.8%		
	neither	32.7%	15.6%		31.7%	32.4%		
	disagree	22.4%	43.8%		22.2%	41.2%		
concerned about functional capabilities	strongly disagree	26.5%	34.4%		28.6%	14.7%		
				0.007				0.85
	strongly agree	4.1%	3.1%		6.3%	2.9%		
	agree	36.7%	6.3%		22.2%	23.5%		
anxious about physical appearance on a daily basis	neither	20.4%	28.1%		30.2%	26.5%		
	disagree	26.5%	37.5%		17.5%	29.4%		
	strongly disagree	12.2%	25.0%		23.8%	17.6%		
				0.21				0.74
disabled	strongly agree	4.1%	9.4%		6.3%	0.0%		
	agree	61.2%	37.5%		19.0%	23.5%		
	neither	22.4%	31.3%		42.9%	38.2%		
	disagree	10.2%	18.8%		17.5%	32.4%		
disabled	strongly disagree	2.0%	3.1%		14.3%	5.9%		
				0.08				0.59
	strongly agree	2.0%	0.0%		14.3%	0.0%		
	agree	30.6%	21.9%		27.0%	35.3%		
disabled	neither	49.0%	40.6%		36.5%	50.0%		
	disagree	16.3%	37.5%		15.9%	5.9%		
	strongly disagree	2.0%	0.0%		6.3%	8.8%		
				0.05				0.24
disabled	strongly agree	0.0%	0.0%		6.3%	2.9%		
	agree	6.1%	6.3%		23.8%	8.8%		

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United States		Japan	
Society	Surgeons	Society	Surgeons
	p-value		p-value
neither	24.5%	23.8%	32.4%
disagree	28.6%	25.4%	41.2%
strongly disagree	40.8%	20.6%	14.7%
	3.1%		
	31.3%		
	59.4%		

Bolded values indicate statistical significance