

Exploring Factors Related to Post-Amputation Pain and 'Telescoping' in Individuals with Limb Loss

BACKGROUND

- Approximately 80% of individuals who have sustained limb loss experience phantom limb pain (PLP) &/or residual limb pain (RLP).¹
- There is still no widely accepted treatment that is effective in reducing PLP &/or RLP in a majority of individuals with limb loss.²
- More knowledge about the influence of phantom limb sensations on recovery may allow for the development of a beneficial treatment.
- One phantom sensation that is thought to be related to post-amputation pain is "telescoping", described as the experience of the phantom limb gradually retracting towards the residual limb over time, giving the impression of a shorter-than-normal phantom.³
- Telescoping is endorsed by roughly 1/3 of those who have had an amputation yet the relationship between telescoping and post-amputation pain is not well understood.⁴

AIM

- This study aims to explore the association between telescoping and various factors including sex, cause of amputation, ongoing PLP &/or RLP, and symptoms of depression and anxiety in a heterogeneous sample of adults who have undergone a limb amputation.
- These relationships were explored in a previous analysis of 23 participants, with the recruitment of an additional 24 participants.

HYPOTHESES

- **Hypothesis 1:** High levels of PLP &/or RLP will be associated with less telescoping (i.e., more normal-length phantoms).
- **Hypothesis 2:** Telescoping will be most frequently reported by individuals who lost their limb because of a traumatic accident than other causes.

Contact information: aternali@yorku.ca

METHODS

- Individuals living with an amputation for at least 3 months completed online questionnaires requesting:
 - demographic information
 - reason for amputation (trauma, cancer, diabetes, non-diabetic vascular, other)
 - telescoping in the past week (yes/no)
 - ongoing pain problems in the past week (yes/no)
 - depression/anxiety symptom severity over the past week (Patient Health Questionnaire 4; PHQ-4, scored as normal, mild, moderate, severe)
- Participants were directed to a mobile/computer-based application (app) developed to measure phantom limb telescoping and related features (<https://demo.phantomlimbs.ca/>).
- Chi-square tests and Bonferroni-corrected post-hoc analyses examined between-group differences comparing participants who endorsed telescoping and those who did not across factors of interest.

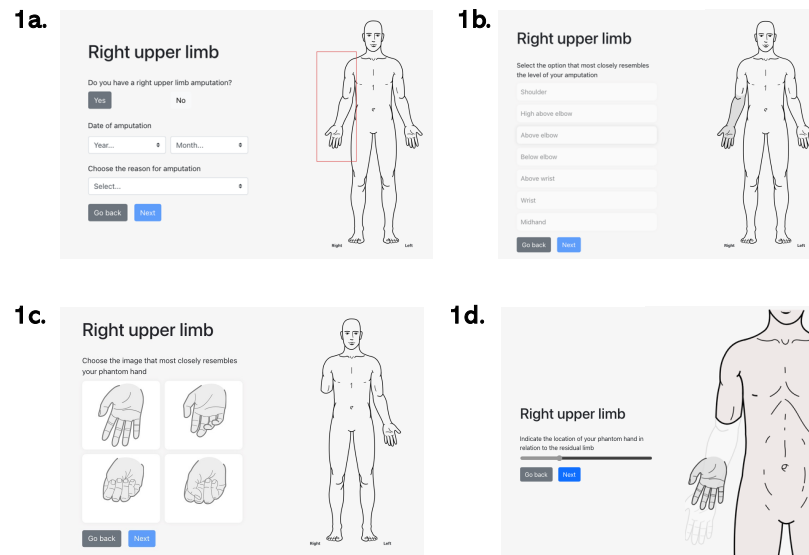


Figure 1. Sample items from the mobile/computer based app used to collect participant information (<https://demo.phantomlimbs.ca/>). Participants are asked to identify the limb(s) that had been amputated. Once a selection is made (right upper limb amputation selection illustrated in Figure 1), they input the date, reason (1a) and level (1b) of the amputation. Participants then select the image which best represents their phantom hand (1c) or foot in the case of a lower limb amputation and use a slider to position the phantom hand (or foot) where they usually feel it in relation to the residual limb (1d).

RESULTS

- 47 participants (17 women; 6 upper limb loss; 41 lower limb loss)
 - 37 (79%) reported RLP, 31 (66%) reported PLP, and 20 (43%) reported telescoping over the past week.
- Telescoping was not associated with sex, or ongoing pain symptoms.
- Telescoping was significantly associated with amputation etiology, $X^2(4, 47)=9.6, p=.048$
 - those who reported telescoping were more likely to have lost their limb from trauma than those who did not report telescoping
 - those who did not experience telescoping were more likely to have lost their limb because of diabetes-related concerns
- Telescoping was significantly associated with the severity of depression and anxiety symptoms, $X^2(3, 46)=9.44, p=.024$
 - Proportionately more individuals who did not endorse telescoping fell in the "normal" range
 - Proportionately more individuals who endorsed telescoping fell in the "severe" range.

DISCUSSION & CONCLUSION

- The results suggest that telescoping is not related to sex or ongoing pain experience.
- Reason for amputation may be related to telescoping status; the current results are consistent with other findings suggesting that telescoping is more common in those who lost their limb due to trauma and less common in those who lost their limb from diabetes-related conditions.⁵
- Telescoping may be associated with increased severity of depression and anxiety symptoms given that individuals who endorse telescoping report more severe symptoms.
- Further research using a larger sample size is needed to replicate these results.
- Longitudinal studies are required to understand the direction of the relationship between telescoping and symptoms of anxiety and depression.

References & Acknowledgments

Andrea Aternali is supported by a Canadian Institutes of Health Research (CIHR) Canada Graduate Doctoral Award. Dr. Joel Katz is supported by a CIHR Canada Research Chair in Health Psychology. Funds to conduct the study were provided by a grant from The War Amps.

