

Effects of hand amputation surgery procedures on phantom limb sensation.

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Objective

Phantom limb syndrome refers to afferent and efferent sensations and perceptions of a missing limb following its amputation. Non-painful phantom limb sensations (nPPLS) and phantom limb pain (PLP) are distinguished in literature. The theories proposed to explain the etiopathogenetic mechanisms show the importance of both peripheral and central phenomena. The presence of neuromas, high levels of amputation and psychological factors contribute to the onset of the syndrome. The objective of this study is to search for relationships between different surgical techniques used in the amputation surgery and phantom limb sensation phenomena.

Methods

11 patients who had undergone a transradial amputation of the hand between 1999 and 2017 were included in the study. Phenomenal characteristics of individual phantom limb sensations are quantitatively assessed by structured interviews such as the interview on phantom sensations (RAM SIPS¹) and the phantom and stump phenomena interview². The surgical procedures performed on the patients (such as cutaneous flaps, nerve treatment and amputation packing techniques) are assessed from the surgical reports. The statistical techniques used for data analysis are the Mann-Whitney test for the comparison between two groups of independent samples and the descriptive analysis of the graphs (box plots).

Results

Mean values for nPPLS are lower in patients in whom cutaneous flaps have been used. The stratification of patients according to demographic, clinical and biometric criteria seems to show how the techniques applied on the severed nerve ends have a greater weight in determining the sensations of phantom limb. The techniques for packing the amputation abutment appear to be also important for phantom limb sensations.

Conclusions

The study allows to infer how the transradial amputation intervention must be performed: from the correct approach to nerve injury to the appropriate choice and realization of soft tissue covering techniques and remodeling of the extremity. The different surgical procedures considered in this study can be important for the characteristics of the phantom limb syndrome.

Despite the limits of the retrospective study and the low number of population, the study is innovative and useful to prevent the development of PLP. The study is currently being improved by taking into consideration the most innovative and recent surgical techniques, increasing the number of subjects and reducing confounding factors.

Bibliography

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