

PHANTOM LIMB: CHARACTERISTICS AND MANAGEMENT

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ABSTRACT

Phantom limb sensation was described for the first time by the French military surgeon Ambroise Pare in the 16th century, where soldiers reported a long-lasting suggestive and physical pain after an amputation. As of today, scientists and physicians still do not have a complete vision and understanding of the phantom limb characteristics. The purpose of this review article is to summarize recent research studies focusing on phantom limb in order to discuss its definition, mechanisms, and treatments thanks to our database and studies with more than 28 patients. A cross-sectional descriptive study was conducted from March 2015 to July 2020. We created a questionnaire which included different questions to divide and understand the various conditions that afflict amputated patients and pain correlated with phantom limb. Overall, 28 patients (mean age 59 ± 6 years), 16 (57,14%) were male and 12 (42,86%) were female. Lower limb amputation (100%) level of amputation was in all cases trans tibial amputation. The main causes were traumatic injuries (57%). The purpose of this article is to focus on phantom limb feeling and pain in order to discuss its definition, mechanisms, and treatments.

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1. Introduction

DNA Since the beginning of medicine, amputation has been one of the major dogmas of surgery, especially in surgical branches like traumatology. Amputation is the loss or removal of a body part, it can be a life changing experience affecting the ability to move, work, interact with others and maintain independence. Phantom limb is described as erosion, burning, irritation or squeezing [1-3]. This manifestation is usually related to tissue stretching and injury, development of a scar or neuroma and is often accentuated by pressure and mechanical factors [4,5]. Amputation etiologies include vascular and metabolic diseases, trauma, infections, and cancer. Identifying the origin of pain is often challenging because of various symptoms from different sources [6-9]. In the population divided by age and in different brackets, younger patients underwent surgical procedure due to traumatic events; instead, amputation in elderly patients is connected to vascular disease or metabolic upset, such as diabetes.

Continuing pain, phantom limb phenomena and emotional trauma can complicate recovery. Approximately 80%-90% of amputees experience phantom limb sensations [10-14].

Phantom pain is stimulated by different inner workings, such as spinal pathology and cortical dysfunction, it usually persists for more than 4 weeks and is described as various sensations including burning, stinging, aching, and piercing pain with changing warmth and cold to the amputated area. Onset of symptoms may be elicited by environmental, emotional, or physical changes [15-16].

Phantom pain is extremely difficult to treat and disabling, therefore, is important to determinate what constitutes phantom pain in order to provide effective care. The therapeutic strategy in phantom pain may be ranked into different approaches as pharmaceutical, psychological, supportive, and surgical [17-21].

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2. Material and methods

Phantom pain sensation can last for years, scientists and doctors have described studies with more than 30 years of chronic pain. In our study on a cohort of 28 patients (mean age 59 ± 6 years), 16 (57,14%) were male and 12 (42,86%) were female. Lower limb amputation (100%), level of amputation was in all cases trans tibial amputation. The main causes were traumatic injuries (57%), followed by malignant tumors (18%), blood circulation disorders (14%) and in some cases congenital malformation (11%). Uncomfortable sensations such as pain, itching and contraction subsisted in 59% of all cases after amputation, where drug therapy was effective in 50% of all cases and the use of specific prosthesis performed well in 61% of them, creating relief and alleviation in patient daily life, where most of the respondents didn't know alternative techniques such as "mirror image therapy".

Based on these studies, it can be described as a psychological consideration of amputate status where the idea of compensation and psycho-trauma with prosthesis can be more efficient than drug therapy or combined with it.

Our database is represented by a questionnaire based on 8 different questions submitted to 28 amputated patients with different ages, backgrounds and traumas. The objective was to evaluate the phantom limb sensation and become aware of the medical condition.

Questions:

1. Cause of amputation?
2. Age at which amputation occurred?
3. Post amputation sensation?
4. Pain amputation in the first three months?
5. Does amputation pain still persist?
6. Have you ever used drugs to relieve pain?
7. Do you know the alternative treatment known as mirror therapy?
8. Have you ever considered the use of a prosthesis?

3. Results

As shown in the graphs, more than 57% of all patients had a traumatic amputation experience (road accidents), 18% cancer amputation, 11% congenital malformation and 14% blood circulation disorders.

Half of the patients during the questionnaire had a surgical amputation at least 10 years prior.

The main symptoms associated with amputation trauma are: contraction sensation 34%, itching 29%, phantom pain 27%, phantom limb utilization 6%, other sensations 4%.

Pain amputation in the first 3 months is described in 86% of all interviewed patients associated with post-operative sorrow.

59% of the total respondents still described uncomfortable sensation during the questionnaire where in the 41% pain has vanished.

50% of the patients had used drug treatments to prevent and alleviate pain sensation.

71% of all patients didn't know and didn't used alternative techniques such as mirror therapy.

39% of the total respondents couldn't accept prosthesis as a solution to amputation due to lack of information and incapacity to evaluate prosthesis implantation as a new possibility. While the remaining 61% still consider prosthesis a daily life solution.

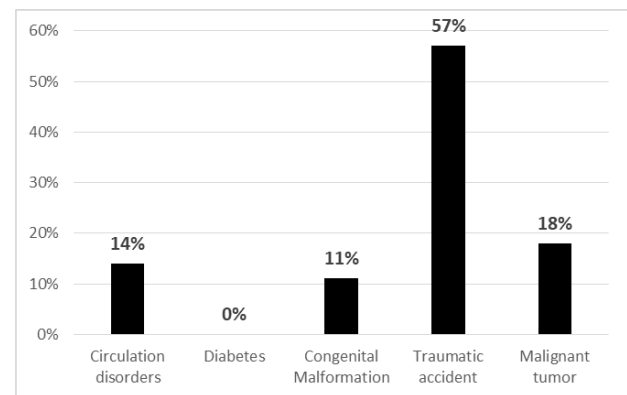


Figure 1. Distribution of amputation causes

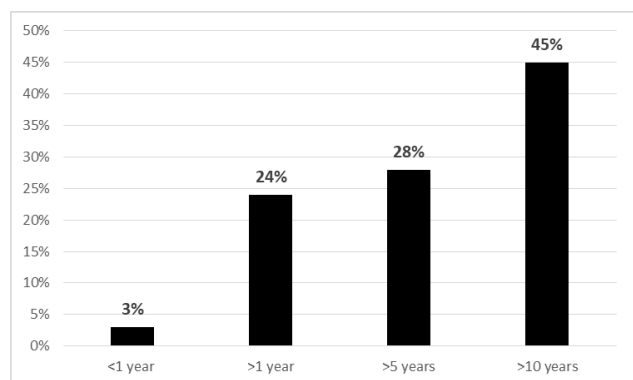


Figure 2. Distribution of time from the amputation of the population in study

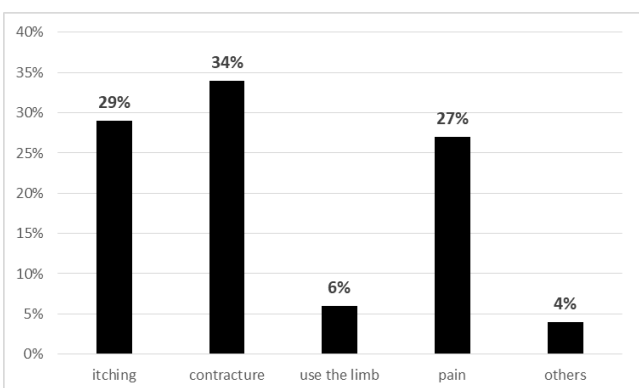


Figure 3. Distribution of sensation on the limb

4. Discussion

Phantom pain is a painful sensation described in the amputated area and is identified as a stabbing and excruciating pain similar to burning. These kinds of phenomena involve neurological components such as compressions and neurogenic suffering. Phantom pain can impair people's daily routine, preventing them from moving, working and living a normal life. The underlying pathophysiology is unclear. However, it is generally accepted that both nociceptive and neuropathic processes are involved. Traumatic amputations are the most common, where inferior limbs are more frequently involved compared to the superior limbs.

Phantom limb syndrome occurs more frequently in patients with severe and longer periods of pain pre-post amputation; they usually describe this sensation as a memory of the previous condition diagnosed before the surgical operation. How is this process possible? Researchers have found that dorsal root ganglion cells, the neurological ones involved in the transportation of sensory impulse and pain, change their activities after a nerve is completely cut. This event transforms dorsal root ganglion cells into more operative and sensitive receptors to chemical and mechanical potential with a consequent boost of all neurological occurrences, including pain.

Paracetamol and Fans therapy are used to treat these kinds of disorders with little benefit. Psychological support is mandatory to help patients accept their condition and avoid negative behavior and thoughts. It's described in the literature how a negative mindset can undermine full recovery of physical and mental activity: anxiety, self-esteem, fear of the new look, influence the perception of the phantom limb with a rejection of the amputated area are closely linked to increased pain and frustration [22].

5. Conclusions

We can confirm that pain is one of the most frequent and severe symptoms in amputated patients. Additionally, we observed that most of our cases develop chronic pain due to traumatic amputation compared with non-traumatic ones, and only a small percentage responds to drug treatments. Alternative treatments, such as "mirror image therapy", are still a taboo and prosthesis replacement are considered a solution in only 61% of our database. Phantom pain and several other symptoms are real and present in most cases, a personal and targeted strategy with psychological and medical treatments is mandatory to alleviate pain and misery. It's still necessary to study and test new procedures to fix phantom limb pain.

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