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Review

Virtual Reality in the treatment of burn patients: A systematic review☆

Soliane Scapin [a,*], *Maria Elena Echevarría-Guanilo* [a], *Paulo Roberto Boeira Fuculo Junior* [b], *Natália Gonçalves* [a], *Patrícia Kuerten Rocha* [a], *Rebeca Coimbra* [a]

[a] *Federal University of Santa Catarina (UFSC), Brazil*
[b] *Federal University of Pelotas (UFPel), Brazil*

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ABSTRACT

Aim: To identify studies that approach immersive virtual realities and its main effects in the treatment of burn patients in the context of the scientific world of literature.
Methods: A systematic review following the steps of Cochrane. The search was conducted in eight databases between May and August 2016.
Results: 34 studies were analyzed, including 23 randomized clinical trials. VR was applied using three-dimensional features and video games. The findings demonstrate the association of this technology with increased enjoyment and the reduction of pain, anxiety and stress during dressing changes and also during physical rehabilitation and physiotherapy. Few side effects have been reported.
Conclusion: VR is a complementary drug strategy that has proven beneficial results in the treatment of burn patients.

Contents

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* *Corresponding author at*: Delfino Conti, s/n°, Trindade, Florianópolis, SC, Zip code: 88040-900, Brazil.
E-mail address: solscapin@gmail.com (S. Scapin).
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1. Introduction

Injuries caused by burns are consequences of aggression to the skin or tissue due to contact with hot substances (liquid or solid), radiation, radioactivity, electricity, friction or contact with chemicals [1].

Every year 265,000 people in the world die from burns. In the United States, the annual costs to the health system due to burn injuries is approximately $486,000, from this total amount 3275 thousand are a result from fires and 2745 result in the death of the victim [2]. In Brazil, it is estimated that one million people suffer from burns per year, with children being the most affected [3]. Data such as these identify that burns represent an important public health problem, especially in low- and middle-income countries. In addition, burns represent one of the main causes of morbidities, involving prolonged hospitalization and long recovery times [4].

During the treatment of burns, the technique of wound debridement, daily dressing changes, functional rehabilitation, repair surgeries and the different procedures performed during hospitalization generate pain, physical stress and psychological damages to the patient [5,6].

Considering the physical and emotional aspects, the non-pharmacological approaches to the treatment of the burned patient are complimentary to medicinal therapy, allowing an integral approach to care [7]. Some non-pharmacological methods that currently demonstrate favorable clinical effects for pain relief include: hypnosis, cognitive-behavioral therapy, relaxation techniques, and interaction through television, music, and storytelling [8–10].

In addition to these methods, the rise of technology has led to the use of Reality virtual for the treatment of burns as a complementary interaction and immersion therapy. It is a psychological technique based on distraction. The more immersive the VR, the greater the experience and concentration on the virtual environment [11]. Besides pain reduction, VR has shown to reduce anxiety and depressive symptoms, as well as improving treatment adherence [12].

Thus, the use of VR works to focus attention, i.e. it distracts the patients in relation to different environmental stimuli, which can consequently reduce the anxiety generated by seeing and experiencing wound care, for example, in the case of burns [13,14].

A systematic review on the use of VR in the treatment of burns analyzed nine studies, in which it was shown that this technology combined with pharmacological analgesics contributes to the reduction of pain and anxiety [15]. In other studies, the results point to the benefits of VR in relation to increased distraction, and patients reported less time thinking about pain, less intense pain and immersion, which facilitates care such as dressing changes and physiotherapy [16,17].

Taking into consideration the benefits which VR brings to the treatment of the burn patient, which presents itself as a potential and important technology for nursing care and multidisciplinary health team, and the absence of recent revisions on the subject, the importance of searching the databases was verified with the objective of identifying the use of VR and its main effects in the treatment of burned patients in the context of the scientific world literature.

2. Method

This is a systematic review of the use of VR in burn patients. This research methodology follows a rigorous protocol of article selection, as well well-designed steps to present the synthesis of the available evidence on the research question.

To guide the present study, the seven steps recommended by Cochrane were followed, which include: formulating the objective and research question, locating and selecting studies, critically assessing studies, collecting data, analyzing and presenting data, interpreting these data, and, finally, the improvement and updating of the review [18].

The development of the steps suggested by Cochrane resulted in the construction of a protocol for the search for intervention studies and compliance with the items included in PRISMA [19]. Thus, the objective of the research was to identify studies that were based on immersive virtual realities and their main effects in the treatment of burn patients in the context of the scientific world of literature.

2.1. *Research question*

In order to achieve the first step a guiding question was formulated: “In the context of scientific literature throughout the world, how has VR been used and what are its main effects in the treatment of burn patients?”.

2.2. *Location and selection of studies*

For the location of the articles, eight databases were used: Latin American and Caribbean Health Sciences Literature (LILACS), *Base de Dados de Enfermagem* (BDENF), Scientific Electronic Library Online (SciELO), Cumulative Index to Nursing & Allied Health Literature (CINAHL), Web of Science, PubMed/MEDLINE, SCOPUS, Academic Search Complete, PsycINFO and Google Scholar.

The selection of the studies occurred from the definition of the individual and combined search strategy of the descriptors and keywords. To select the descriptors, Descriptors on Health Sciences (DeCS) and the Medical Subject Headings (MeSH) were used. Due to the different characteristics of the chosen databases, the search was performed with different strategies (Chart 1). It should be emphasized that the elaboration of the

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