


## **VIRTUAL REALITY AS COMPLEMENTARY TREATMENT IN PAIN RELIEF IN BURNT CHILDREN**

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### **ABSTRACT**

**Objective:** to report the use of virtual reality and its effects on clinical parameters, pain and its consequences in the treatment of two burned children in a Burn Treatment Center in southern Brazil.

**Method:** case report on the use of virtual reality in two burned children treated at a reference burn treatment center in southern Brazil. Data were collected from January to February 2017, using the variables: pain, distraction, clinical parameters (heart rate and oxygen saturation) and analgesic medications. The measurements were carried out in five occasions and the intervention was applied for three days. The reports and reactions of children, guardians and the nursing team were also registered.

**Results:** the use of virtual reality during dressings reduced the pain between two to four points on the scale used; oxygen saturation remained between 96 and 98%; heart rate decreased after the intervention. The children reported having fun, less time thinking about pain and were more collaborative during the procedure.

**Conclusion:** this technology is innovative in the treatment of burned children and proved to be effective for the analyzed variables. New clinical studies with a larger sample are needed in the Brazilian context to contribute to these findings.

**DESCRIPTORS:** Virtual reality exposure therapy. Burns. Pediatrics. Pain. Implosive therapy.

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# REALIDADE VIRTUAL COMO TRATAMENTO COMPLEMENTAR NO ALÍVIO DA DOR EM CRIANÇAS QUEIMADAS

## RESUMO

**Objetivo:** relatar a utilização da realidade virtual e os seus efeitos sob parâmetros clínicos, dor e suas consequências no tratamento de duas crianças queimadas em um Centro de Tratamento de Queimados do Sul do Brasil.

**Método:** relato de caso sobre a utilização da realidade virtual em duas crianças queimadas atendidas em um centro de tratamento de queimaduras de referência do sul do Brasil. Os dados foram coletados de janeiro a fevereiro de 2017, a partir das variáveis: dor, distração, parâmetros clínicos (frequência cardíaca e saturação de oxigênio) e medicamentos analgésicos. As medidas foram realizadas em cinco momentos e a intervenção foi aplicada durante três dias. Foram anotados, também, os relatos e as reações das crianças, dos responsáveis e da equipe de enfermagem.

**Resultados:** o uso da realidade virtual durante o curativo diminuiu a dor entre dois a quatro pontos da escala utilizada; a saturação de oxigênio manteve-se entre 96 a 98%; a frequência cardíaca obteve redução após a intervenção. As crianças relataram diversão, menor tempo pensando na dor e foram mais colaborativas durante o procedimento.

**Conclusão:** esta tecnologia é inovadora no tratamento de crianças queimadas e mostrou-se eficaz para as variáveis analisadas. Novos estudos clínicos com uma amostragem maior são necessários no contexto brasileiro para contribuir com esses achados.

**DESCRITORES:** Terapia de exposição à realidade virtual. Queimaduras. Pediatria. Dor. Terapia impositiva.

# REALIDAD VIRTUAL COMO TRATAMIENTO COMPLEMENTARIO EN ALIVIO DEL DOLOR EN NIÑOS QUEMADOS

## RESUMEN

**Objetivo:** informar el uso de la realidad virtual y sus efectos bajo parámetros clínicos, dolor y sus consecuencias en el tratamiento de dos niños quemados en un Centro de Tratamiento de Quemaduras en el sur de Brasil.

**Método:** informe de caso sobre el uso de la realidad virtual en dos niños quemados tratados en un centro de tratamiento de quemaduras de referencia en el sur de Brasil. Los datos se recopilieron de enero a febrero de 2017, a partir de las variables: dolor, distracción, parámetros clínicos (frecuencia cardíaca y saturación de oxígeno) y medicamentos analgésicos. Las mediciones se llevaron a cabo en cinco momentos y la intervención se aplicó durante tres días. También se anotaron los informes y las reacciones de los niños, tutores y el equipo de enfermería.

**Resultados:** el uso de la realidad virtual durante el vendaje redujo el dolor entre dos y cuatro puntos en la escala utilizada; la saturación de oxígeno se mantuvo entre 96 y 98%; la frecuencia cardíaca disminuyó después de la intervención. Los niños informaron que se divertieron, menos tiempo pensando en el dolor y fueron más colaborativos durante el procedimiento.

**Conclusión:** esta tecnología es innovadora en el tratamiento de niños quemados y demostró ser efectiva para las variables analizadas. Se necesitan nuevos estudios clínicos con una muestra más grande en el contexto brasileño para contribuir a estos hallazgos.

**DESCRIPTORES:** Terapia de exposición mediante Realidad virtual. Quemaduras. Pediatría. Dolor. Terapia impositiva.

## INTRODUCTION

Burns are traumatic injuries usually caused by thermal, chemical, physical or radiological agents that affect the skin and its attachments, and which can extend to tissues, muscles and bones; therefore, they are classified according to depth and size, according to the body surface affected.<sup>1</sup>

In Brazil, it is estimated that one million people suffer burns a year, with two thirds being children and adolescents. In 2013 and 2014, more than 15 thousand cases of hospitalizations due to burns of children between zero and ten years were recorded, with the majority of accidents occurring at home.<sup>2-3</sup> This reality is reproduced in other countries, for example, in the United States, where there are, on average, 486,000 annual health treatments for burns, among which 3,275 lead to death.<sup>4</sup>

In this context, it should be warned that, regardless of the person's life cycle, burns are capable of causing physical and psychological changes that lead to uncertainties regarding the future and regarding treatment routines, whose procedures generate pain and psychological repercussions.<sup>5</sup>

In pediatric patients, pain can be highlighted in the acute phase of the burn, which includes hemodynamic stabilization, recovery of capillary integrity and improvement of physical and cognitive status. It is at this stage that dressing changes, debridement, grafting, physical therapy is experienced with greater intensity. Therefore, in this recovery process, burned children and adolescents may show irritability, aggressiveness and resistance to talk about trauma and psychological disorders.<sup>6-8</sup>

That said, in order to reduce the negative repercussions during this period, pain control is a basic need and a right for children and adolescents, and should be a priority during nursing care. Drugs are used to guarantee analgesia, which, although in a combined way, soothe, do not completely eliminate pain during or after the procedures.<sup>9</sup> Therefore, non-pharmacological methods of pain relief represent important strategies as a complementary way to treat burns. One of the currently studied non-pharmacological methods is Virtual Reality (VR).<sup>10-11</sup>

VR is an innovative method that, with the aid of a helmet or glasses, gloves or joystick, with voice or movement command, provides multisensory information, allowing the user to have a three-dimensional view in a virtual immersed environment and the sensation of acting and living within that location, in real time, in other words, it provides the perception of actually being in a different environment, and provides distraction from the sensations from the real environment.<sup>12-15</sup>

International researches that tested this device in burned patients demonstrated that there was a considerable decrease in pain when VR was used before and during painful procedures, in addition to decreasing time thinking about pain, generating distraction and increased fun during dressing changes.<sup>14-17</sup>

Furthermore, a literature review that sought to understand the effects of VR on burned patients pointed out that the selected studies showed a reduction of more than 20% in pain intensity, and yet, 66.6% of these studies showed a 30% reduction in pain, which leads to believe that VR influences the perception of pain, changing the way signs are interpreted and reducing their levels.<sup>17</sup> In a randomized study carried out with burned children during dressing changes, it was found that the rates of respiratory rate and pulse remained more physiological in children who used VR and that there was no variation in oxygen saturation (SatO<sub>2</sub>) during the dressing.<sup>10</sup>

In addition to the proven reduction in pain and other physiological parameters such as heart rate, VR also acts on emotional parameters. It reduces anxiety and time thinking about pain, it increases fun and it can also decrease hospitalization time due to favoring the reepithelization of burn injuries.<sup>18</sup>

Based on this, considering that there is only one study identified in the Brazilian context with this theme,<sup>19</sup> as well as the need to evaluate the effects of VR regarding pain relief, distraction and the impact on clinical parameters, the objective of this study is to report the use of VR and its effects on clinical parameters, pain and its consequences in the treatment of two burned children in a Burn Treatment Center (BTC) in southern Brazil.

## METHOD

This is the case report on the use of VR in two children treated at a reference BTS in southern Brazil, between January and February 2017. The intervention was performed during dressing changes, due to the evidence of greater painful intensity during this procedure.<sup>4-20</sup> In this case, dressing is considered to be the technique that consists of opening, removing bandages, performing balneotherapy, choosing and inserting the dressing and closing the lesion.

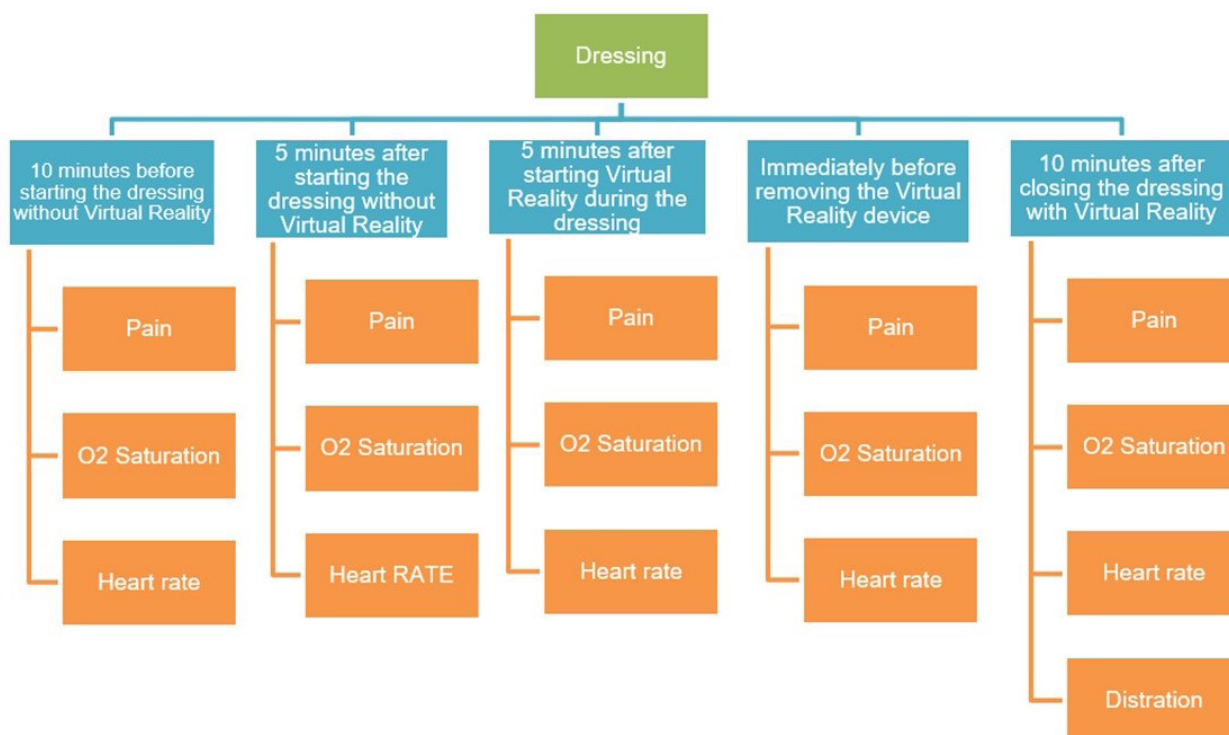
The intervention with VR took place using a Samsung Note S4® cellphone coupled with the three-dimensional image glasses and stereophonic sound of the Samsung Gear VR Innovator Edition for Note 4®. The Samsung Note S4® smartphone played three-dimensional games which were downloaded for free. The options for images and games involved: roller coaster simulator Roller Coaster Crazy Tour®, roller coaster in the Jurassic world Real Dinosaur Roller Coaster®, Zoo Forest Animals Adventure®, marine environment Sea World VR2®, Milky way Zen Fone® and Airplane Pilot Flight Simulation® flight, which children could choose freely, since all games were suitable for the age group of the study.

To assess the effects of intervention with VR, the following variables were considered: pain, distraction, clinical parameters of oxygen saturation (SatO<sub>2</sub>) and heart rate (HR), and analgesic medications. In addition, reactions were observed and reports were collected from the children, their legal guardians and the nursing team involved in the dressing. The reports were written by the researcher at the time they happened.

Pain and distraction (time thinking about pain) were evaluated by the face scale superimposed on the numerical scale, due to the ease of interpretation by the children.<sup>20</sup> In this case, the first face and the number 0 (zero) meant the absence of pain and the last face and the number 10 (ten) represented the worst pain ever felt. Regarding distraction, the number 0 (zero) and the first face symbolized that no time was spent thinking about pain during the intervention with VR and the last face and the number 10 (ten) meant all the time thinking about the pain.

To assess pain, the scale was applied in five different moments: 10 minutes before dressing, 5 minutes after dressing started without VR, 5 minutes after dressing started using VR, immediately before removing VR and 10 minutes after the dressing is closed. Distraction was assessed up to 10 minutes after the dressing was closed without VR, by asking the question: "Looking at this scale, where would you mark the time you spent thinking about pain when using VR?" (Figure 1).

The clinical parameters (SatO<sub>2</sub> and HR) were evaluated by a portable electronic device (oximeter), placed on one of the children's fingers. The measurements were performed at the five moments described (Figure 1). It is important to mention that the same device was used during the entire intervention. In addition, reference values were considered according to the age of the participants: HR 70 to 110 heartbeats per minute (bpm) and for SatO<sub>2</sub> greater than or equal to 95%.<sup>21</sup>



**Figure 1** – Flow chart of pain, distraction and clinical parameters of burned children and adolescents during the three days of Virtual Reality therapy

In addition to the variables presented, observations were made and questions were asked regarding the presence of side effects, such as nausea and vertigo during the intervention. The researchers' observations were recorded on the data collection instrument whenever the intervention took place, to complement the other evaluations, with fun and immersion during the use of VR glasses, in addition to the children's expressions.

It should be noted that the purpose of VR was to complement pharmacological treatment; for this reason, medications were administered according to medical prescription and institutional routine. In addition, the intervention did not intervene in the choice of dressing coverage, which was the responsibility of the care team.

The intervention was applied for three days on the days when a dressing was changed. It should be noted that the children were free to choose when they would start wearing the glasses during the dressing change, but the minimum amount of time wearing the glasses was limited 5 minutes.

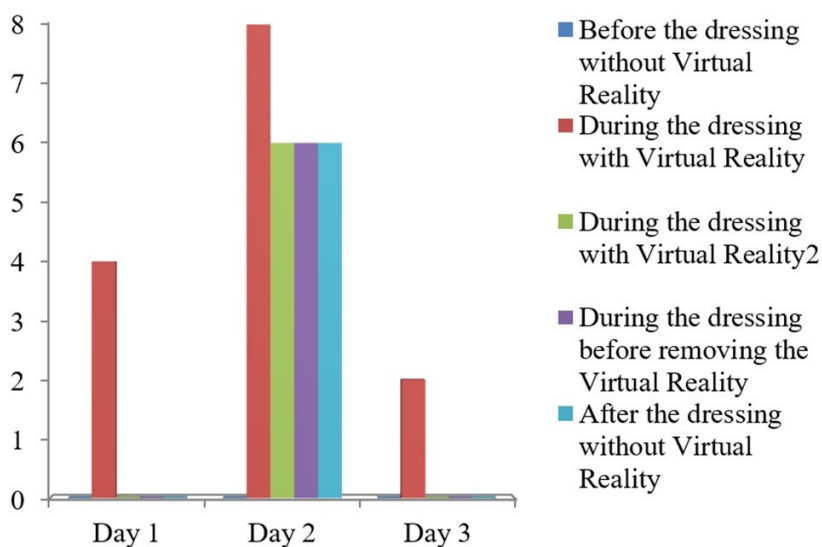
For the use of images and publication an authorization was requested from the child and his/her guardian through the Term of Assent and the Term of Free and Informed Consent. All ethical principles were respected as determined by Resolution No. 466/2012.

## RESULTS

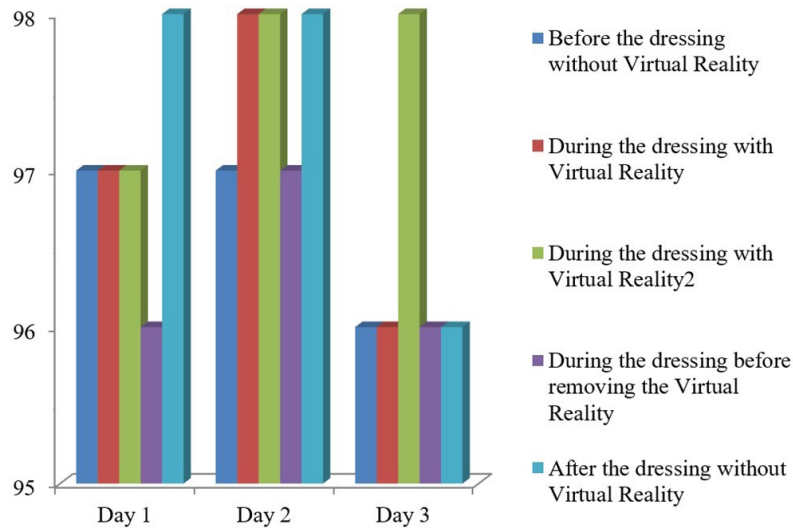
### Case 1

E.C., an eight-year-old male student arrived at the hospital's outpatient clinic on January 9, 2017, accompanied by his stepfather. He had a history of burns with alcohol, which occurred six days ago, on his left lower limb, including the anterior region, calf and foot. The accident occurred through an attempt by the child to light a wood stove. In the initial assessment, the child had stable vital signs, reporting pain in the burned areas. After evaluation, a classification of 6% of burned body surface

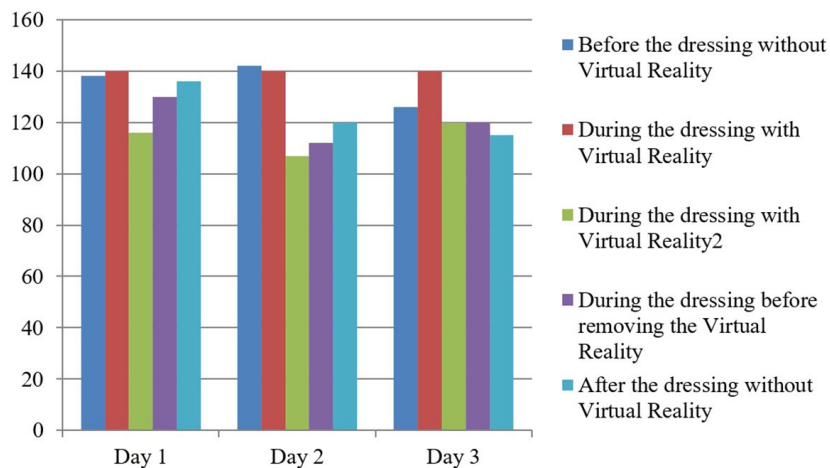
and partial superficial and total thickness burns was made. On the same day, the child was admitted to the BTC and started treatment with a non-adherent dressing, which remained for 72 hours. On January 12, the first dressing change and VR use were performed. Analgesia with Morphine® was used before commencing balneotherapy. On this day, the child used VR for 30 minutes, alternating the simulator games of roller coaster, the Jurassic and Zoo world. Regarding the pain intensity, the child reported that he felt pain during the dressing, before starting the VR therapy. After the start of therapy, there was a drop of 4 (four) points on the numerical scale (Figure 2). There was a variation in SatO2 between 97 to 98% throughout the procedure (Figure 3). The HR of 140 decreased to 116 bpm when the use of VR started (Figure 4). On this day, the child reported not thinking about pain when using VR. While using the VR glasses, it was observed that the child was distracted and immersed, moving his head and torso, responding to the stimuli generated by the game images; in addition, he reported having fun. At the end, the dressing was closed using foam with Alginate foam and silver. There were no reports of side effects or the need for rescue medication. On January 13, the dressing was applied again and the VR was applied. Morphine® was used one hour before opening the dressing. On this day, the child used VR for 15 minutes, during balneotherapy, preferring the roller coaster games with dinosaur and marine world. When pain measurements were analyzed, a reduction of 2 (two) points in the pain intensity with VR was noticed (Figure 2). In relation to SatO2, it remained at 98% (Figure 3). HR decreased from 140 to 107 bpm when the intervention was started (Figure 4). On this day, the child reported spending more time thinking about pain in relation to the first day of intervention; however, he did not cry during the dressing while using VR. The dressing was closed again with Alginate foam and silver. On January 14, the dressing was changed again and analgesia with Morphine® was given one hour before the dressing was opened. VR was used for 20 minutes, and the child alternated between the roller coaster, milky way, flight simulator and zoo games. Pain decreased by 2 (two) points (Figure 2), while SatO2 remained between 96 to 98% (Figure 3), and HR decreased from 140 to 120 bpm (Figure 4) during VR. The child reported not thinking about the pain a lot during the intervention, expressed joy during the roller coaster and fun during all the games. The nursing team reported an improvement in the child's collaboration when wearing glasses. On this day, the use of non-adherent Biatan® dressing started. And on January 20, E.C. was released from hospital.



**Figure 2** – Pain measurements in the three days of the intervention with Virtual Reality. Florianópolis, Santa Catarina, 2017



**Figure 3** – Oxygen saturation measurements (%) in the three days of the intervention with Virtual Reality. Florianópolis, Santa Catarina, 2017

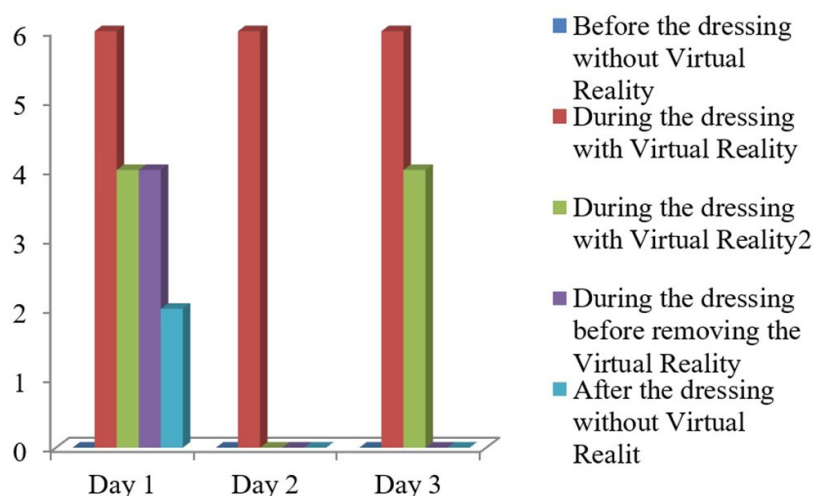


**Figure 4** – Heart rate measurements in the three days of the intervention with Virtual Reality. Florianópolis, Santa Catarina, 2017

## Case 2

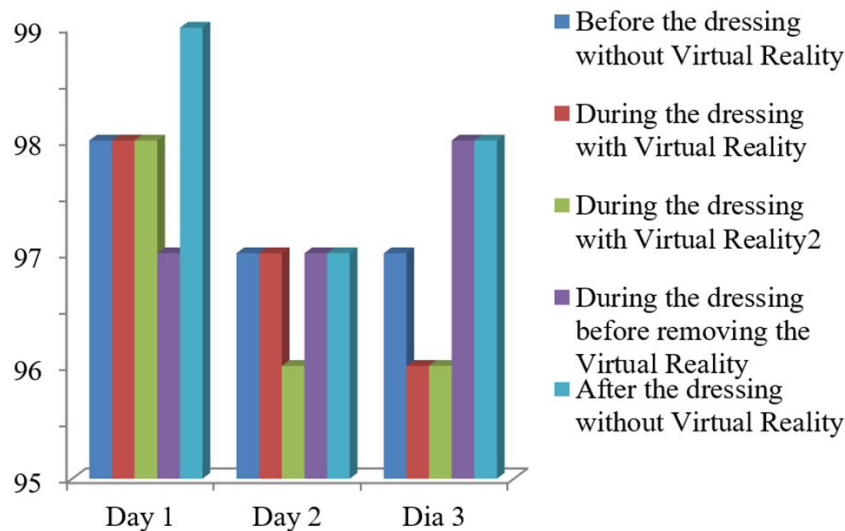
R.A.G.C., 12 years old, female student, arrived at the hospital on January 10, 2017, accompanied by her mother, with a history of burns to her abdomen, left lower limb and right lower limb, with hot water as the causative agent. The hot water burn episode happened the same day, in the morning, when the child spilled water from the pot on the stove. In the initial assessment, the child had stable vital signs, reporting pain in the burned areas. After evaluation, a classification of 20% of burned body surface and partial and total thickness burns was performed. On the same day, the child was admitted to the BTC and started treatment with a non-adherent dressing, which remained for 48 hours, requiring the dressing to be changed for excess secretion. On January 12, the first dressing change and the first day of VR use were performed. Analgesia with Morphine® was administered before commencing balneotherapy. When evaluating the pain scale, it was noticed that there was an increase of 6 (six) points when the dressing was started and that there was a reduction of 2 (two)

points when the child started using VR glasses (Figure 5). SatO2 remained stable (98%) and HR varied from 128 to 130 bpm when starting VR (Figure 6). As for distraction, the child reported 4 (four) points. On this day, the child used VR for 10 minutes, during balneotherapy, alternating the roller coaster and milky way simulator games. During the use of VR, it was noticed that the child interacted with the game and showed less expressions of pain. In addition, the nursing team reported greater collaboration during balneotherapy. The child preferred to remove the glasses after balneotherapy, as she wanted to visualize the injury, and her wish was respected. The dressing was closed using 1% silver sulfadiazine. On this day, there were no reports of side effects or the need for rescue medication. On January 13, the dressing was applied again and the VR was applied. For prophylactic analgesia, Morphine® was used one hour before the dressing was opened. On this day, the child used the VR for 25 minutes, during balneotherapy and dressing, preferring the roller coaster, marine world and zoo games. In relation to the painful intensity, a reduction of 6 (six) points was noticed when the intervention was started, which was maintained throughout the dressing (Figure 5). SatO2 remained at 97% and HR decreased from 174 to 125 bpm with the use of VR (Figures 6 and 7). On this day, the child reported that he did not think about the pain during the dressing with VR. She said that she felt much better wearing the glasses and did not want to remove them to observe the closure of the dressing. The dressing was again closed with 1% silver sulfadiazine. On January 14, the dressing was changed again and analgesia with Morphine® one hour before the dressing was opened. On this day, the child wore glasses for 30 minutes and alternated between the roller coaster, milky way, flight simulator and zoo games. By analyzing the pain intensity, it is clear that there was an increase of 6 (six) points during the dressing and a decrease of 2 (two) points when the VR was used. Before completing the intervention, the child reported having no pain whatsoever, which remained after the dressing (Figure 5). SatO2 was observed in 96% and the HR decreased from 140 to 108 bpm after the beginning of VR (Figures 6 and 7). On this day, the child reported not having thought about pain during VR. The child interacted during the roller coaster game, moving his upper limbs and smiling. The mother thanked the team and the researcher for the use of VR, as she felt that her daughter was calmer not only during the dressing but also in the moments that preceded it. It is noteworthy that, in none of the three days of treatment with VR, there were reports of adverse effects and the need for rescue medications. In the days that followed, the child underwent grafting. After the recovery period, he was discharged on January 18.

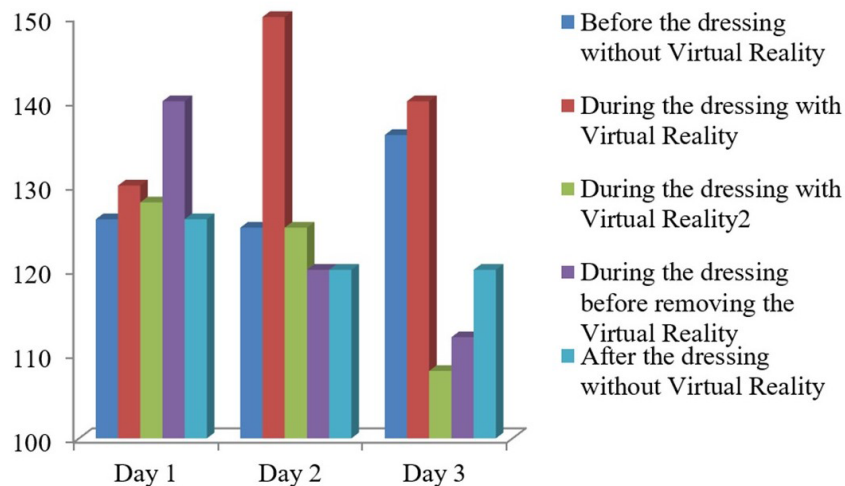


**Figure 5** – Pain measurements in the three days of the intervention with Virtual Reality. Florianópolis, Santa Catarina, 2017





**Figure 6** – Saturation measures (%) in the three days of the intervention with Virtual Reality. Florianópolis, Santa Catarina, 2017



**Figure 7** – Heart rate measurements in the three days of the intervention with Virtual Reality. Florianópolis, Santa Catarina, 2017

## DISCUSSION

There are great challenges when it comes to controlling the intensity of pain, especially the pain caused by burn treatment in the pediatric population. In addition, psychological effects, such as anxiety, modify the painful perception and can impair treatment and decrease the collaboration of children and adolescents.<sup>22</sup> For these reasons, it is increasingly necessary to incorporate non-pharmacological measures that help the child and the adolescent to deal with the pain and its repercussions. In this scenario, VR represents a promising complementary therapy due to the positive results in relation to pain reduction and its consequences.<sup>10-16</sup>

Previous studies have already found the effectiveness of VR in reducing pain, especially during painful procedures, such as dressing changes and physiotherapy.<sup>10,12,23</sup> However, it is necessary to improve studies, apply other methodological designs in different realities and incorporate other parameters and more outcome measures, in order to consolidate the effects of this therapy in the treatment of burned children.<sup>19,24</sup>

Therefore, in this study, in addition to the pain scale, other parameters related to the positive effects of VR were evaluated, such as the impact on other clinical variables. The results in relation to pain reduction are in line with other findings in previous research. In both reported cases, there was a reduction in pain scores after starting VR therapy during the three days of treatment. It was found that the minimum scale reduction used was 2 (two) points and the maximum 6 (six). It is worth mentioning that, at no time, in the two cases studied, the pain remained or increased after the beginning of the intervention.

In the findings, it is possible to identify that the children in the study felt less pain while using VR, a fact also evidenced in the results of other studies with clinical designs.<sup>10,12,17</sup> In a randomized study carried out with 30 adolescents, where a group received the treatment associated with distraction through a film and another received VR therapy, demonstrated that the VR treatment group reported at least 23.7 points less pain compared to the control group, using a 100-point scale ( with a 95% confidence interval,  $p = 0.029$ ). And, compared to standard care, the VR group had less pain before the procedure and during the dressing.<sup>16</sup>

The reduction of at least 2 (two) points on the numerical scale is the same result found in other studies,<sup>10,12,17,25</sup> which shows that, although it is a study with few participants, there was an association between the intervention with VR and pain reduction.

It was also noticed that the decrease in pain intensity remained constant during the three days of treatment. The same result was found in a preliminary study, in which it was suggested that the effectiveness of VR does not decrease throughout the treatment, considerably reducing pain scores even after several sessions, in contrast to the use of medications, which require dose adjustments and change of drugs.<sup>11</sup>

The anxiety caused by the routine performance of painful procedures causes the child to respond to the pain that is triggered even before the procedure is started. This fact causes some children to develop, in addition to neuropathic pain, caused by the burn injury, psychological pain, which generates a series of consequences, such as: reduced appetite, resistance to therapy and reduced collaboration during hospitalization.<sup>26</sup> Thus, it is noted that the application of VR therapy tends to minimize these effects, since it reduces the child's stress and anxiety during the procedure, making it less traumatic.<sup>23-27</sup>

These consequences can be seen in this study; after all, before starting the dressing, the children reported no painful sensation on any treatment day, with an important receptivity and expectation for the start of treatment being perceived. It should be mentioned that, in relation to distraction, it was noticed that, with the exception of the second day of Case 1, where the child referred 6 (six) on the numerical scale, there were positive evaluations. Assessments regarding time thinking about pain suggest that VR provided distraction, diverting the focus from the pain generated by the procedure. Likewise, a randomized study carried out in the United States, using magnetic resonance imaging, during VR therapy, found that there was a reduction in pain-related brain activity in all five regions of the nervous system linked to the painful response, reducing pain recognition through distraction.<sup>25</sup>

In addition, the subjective effects of VR therapy should also be valued. The children in the present study demonstrated that they were immersed in the virtual world by moving their bodies in response to games and reducing facial expressions of pain. Still, there was a report by the nursing team about the greater collaboration of the child during the procedure and the family in recognizing that the child was calmer both during the dressing and in the moments that preceded it. These aspects perceived during the intervention are related to the feeling of presence. Presence is the subjective

feeling of being in an environment that is not real; this feeling, in most cases, is measured in reports associated with behavioral manifestations, such as greater collaboration during painful procedures.<sup>28</sup>

The greater collaboration of participants during the use of VR can also positively influence the nursing team, since they will be exposed to less stress and will be able to conduct the procedures with more tranquility. These aspects facilitate the relationship between children, staff and family.<sup>29</sup>

As for the clinical parameters evaluated, it was noticed that there were no significant variations in oxygen saturation and that it remained stable within the values considered physiological. The same result was found in a previous study.<sup>10</sup> The absence of changes in oxygen saturation can be explained by the fact that this is not the best parameter to be evaluated, since it is influenced by multiple factors which are not related to pain, for example: age, medication use and body temperature.<sup>17</sup>

The heart rate assessment showed significant variations, since, during the use of VR glasses, there was a reduction in the values, reaching the reference/expected physiological parameters. This can be a good parameter to be evaluated in future studies, since pain physiologically raises heart rate in response to sensory stimuli in the Central Nervous System, and is also related to emotional factors, such as anxiety and stress.<sup>30</sup> Thus, it appears that in this case, VR indirectly reduced the patient's stress and anxiety, contributing to the reduction of pain.

It is also noteworthy that the use of VR did not have any negative effects on the studied patients, because the children did not report side effects. There was no need to use additional medications, in addition to those prescribed in the pre-procedure. These findings have also been reported in previous studies.<sup>11,16,25,31</sup>

It is well known that the use of VR in this study has shown positive results, as well as those found in the scientific literature with regard to pain reduction and more physiological heart rate parameters during the intervention. These results demonstrate how much VR can assist in the treatment of pediatric patients without side effects, in addition to being well accepted method by the nursing staff and the patients' families.

## CONCLUSION

VR is an innovative technology that is well accepted by the studied pediatric population and that presents positive results during the treatment of pain and its consequences. In addition, the nursing staff and the family of burn victims are recognizing the benefits of distraction, tranquility and less time thinking about pain, both at the time of dressing and before.

It is noticed that, even if it is a case study, which is not possible to carry out statistical analyzes and generalizations of the findings, there were positive results in terms of pain reduction, with a minimum of 2 (two) points and a maximum of 6 (six), distraction and sense of presence. In addition, the children were possibly less stressed and anxious, which makes the recovery process less traumatic.

Clinical studies in the Brazilian context with statistical analysis will be necessary. The evaluation of other variables that may contribute to these findings on the effects of VR can also be considered.

The limitations of the present study are related to the small number of children submitted to the intervention, which compromises the analysis and generalization of the data. However, even with this limitation, it was noticed that there was a reduction in the score of painful intensity, less HR oscillation and positive observations and reports during the use of VR.

This study, when asking "How can this information affect nursing practice?", considering the use of innovative technology, with scientific evidence to reduce pain, distraction and physiological parameters, demonstrated that VR is being well accepted in the treatment of burns in the pediatric community, generating positive results in the treatment of pain and its consequences. Thus, this information can lead nursing professionals to believe that this non-pharmacological therapy can become

an adjunct to complementary analgesia. As VR makes children more relaxed and collaborative, it can facilitate nursing practices during procedures that cause pain. Furthermore, it appears that, from the report of the nursing team that observed the most collaborative children, VR contributes to a feeling of satisfaction and enthusiasm in health professionals, when they develop their work practices, and follow progression and improvement of children's well-being.

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## NOTES

### ORIGIN OF THE ARTICLE

Extracted from the thesis - Virtual reality as complementary therapy in the recovery of children and adolescents who suffered burns: a non-randomized controlled clinical study, presented to the *Programa de Pós-Graduação em Enfermagem, Universidade Federal de Santa Catarina*, in 2018.

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Study design: Scapin S, Echevarría-Guanilo ME.

Data collect: Scapin S.

Data analysis and interpretation: Scapin S, Echevarría-Guanilo ME, Funculo Junior PRB, Tomazoni A, Gonçalves N.

Discussion of results: Scapin S, Echevarría-Guanilo ME.

Writing and / or critical review of content: Scapin S, Echevarría-Guanilo ME, Funculo Junior PRB, Tomazoni A, Gonçalves N.

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### APPROVAL OF ETHICS COMMITTEE IN RESEARCH

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### CONFLICT OF INTEREST

There is no conflict of interest.

### HISTORICAL

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