Influence of virtual reality on pain, fatigue, functional capacity and quality of life in fibromyalgia: a case study

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ABSTRACT

Objective: The objective of this study was to evaluate the effect of Virtual Reality (VR) associated with physical exercises on quality of life, fatigue, pain levels, and functional capacity in a woman with Fibromyalgia. Methods: This is a case report that evaluated one patient diagnosed with FM before and after the intervention with VR associated with physical exercise. The evaluation scales used were: Fibromyalgia Impact Questionnaire, Health Assessment Questionnaire, Visual Analogue Scale for Pain, Pain Catastrophizing Scale, Fatigue Severity Scale and pressure pain threshold evaluation at 18 tender points with a digital pressure algometer. Treatment was conducted for 6 weeks, with 2 sessions per week, totaling 12 treatment sessions. Results: The study showed that treatment with VR promoted an improvement in the impact of FM in the volunteer’s quality life, a decrease in catastrophic sensation of pain and a decrease in fatigue. It was also possible to notice an improvement in the pressure pain threshold at 16 tender points. Conclusion: A rehabilitation program for people with FM that involves VR combined with the practice of physical exercises contributed to the improvement of cognitive and physical aspects. The association of these two therapies was beneficial, since cognitive stimuli and the practice of a physical activity could promote improvements in function, fatigue, quality of life, and pain perception of these individuals.

Keywords: Virtual Reality Exposure Therapy, Quality of Life, Fatigue, Catastrophization

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INTRODUCTION

Fibromyalgia (FM) is the second most common rheumatic disease of unknown etiology, with a prevalence of 2% to 8% in the population. Its main characteristic is the presence of chronic generalized musculoskeletal pain, fatigue, sleep disturbances, cognitive alterations and depression. It mainly affects women aged 30-50 years, commonly diagnosed according to the 2010 American College of Rheumatology (ACR) criteria.

The existing literature shows that the generalized pain of these patients has neural origin, that is, they present an imbalance in the neurotransmitters of the central nervous system (CNS), leading to an amplification in the interpretation of pain, characterized by allodynia and hyperalgesia.

As this is a persistent and debilitating disease, FM symptoms directly influence the activities of daily living (ADLs), work ability and the quality of life. Therefore, FM symptoms directly influence the activities of daily living (ADLs), work ability and the quality of life.

OBJECTIVE

The objective of this study was to evaluate the effects of virtual reality associated with physical exercises in the quality of life, fatigue, pain levels, and functional capacity of a female patient with fibromyalgia.

CASE REPORT

V.A.R is a 42 years old patient, with 71 kg, 1.68 cm, born in São Carlos / SP (Brazil), diagnosed with Fibromyalgia, unemployed, non-smoker and non-alcoholic who uses medical drugs for systemic arterial hypertension (SAH). This patient reported no other associated rheumatologic diseases and did not perform physical activity in the last three months according to the Habitual Physical Activity Questionnaire (BAECKE). Prior to the evaluation and data collection, this study was approved by the Ethics Committee on Research in Human Beings of the Federal University of São Carlos under protocol number 1,451,333, and all the ethical criteria of the research were respected.

An initial evaluation was made to collect the anthropometric data and, after that, the volunteer responded to the Fibromyalgia Impact Questionnaire (FIQ), the Functional Capacity Questionnaire (FCQ), the Visual Analogue Scale for Pain, The Pain Catastrophizing Scale, Fatigue Severity Scale (FSS) and Pain Pressure Threshold Assessment on 18 tender points with a digital pressure algometer (ITO brand - Physiotherapy & Rehabilitation, Japanese model OE-220).

After the initial evaluation, the treatment started with VR associated with the practice of physical exercises, for 6 weeks, with 2 sessions per week, a total of 12 treatment sessions. A re-evaluation was conducted at the end of the last session.

The applications of VR were developed in the Laboratory of Immersive, Interactive and Collaborative Visualization (LaVIIC) of the Department of Computation (DC) of UFSCar. Therefore, the applications used included Gesture’s. This software was composed of three independent applications based on gesture recognition, that is, this free software was controlled by motor gestures of the upper limbs (UL) and lower limbs (LL). The applications were: i) Gesture Puzzle: a virtual Puzzle (UL); ii) Gesture Chair: a PacMan-like game (UL); iii) Gesture Maps: Controls Google Street View navigation in Google Maps (LL). Before the beginning of this procedure, the volunteer had familiarization sessions with the equipment and each of the applications.

Concomitantly with each VR application, the volunteer should perform physical exercises. Hence, associated with application iii), the volunteer performed a 10-minute stationary walk at a self-selected rate. After that, associated to the application ii), the volunteer controlled the PacMan with movements of the upper limbs and, after the end of the game, the volunteer performed a scale movement on the Swiss ball. Finally, associated to application i), the volunteer mounted the pieces of a puzzle using movements of the upper limbs associated with movements of lateral squat, climb in lateral and frontal step and lateral gait crossing the legs. All the applications were performed for 10 minutes associated with the exercises and, at the end of the session, stretches were made for the upper and lower limbs. Table 1 shows the questionnaire and VAS data that were answered before and after the proposed treatment with VR.

DISCUSSÃO

This Case Report showed that VR treatment promoted an improvement in the impact of FM in the volunteer’s life, a decrease in The Pain Catastrophizing Scale score and a decrease in fatigue. It was also possible to notice an improvement in the pressure pain threshold at the 16 tender points, only the lower right cervical points and the higher right trochanter did not have their pain pressure threshold increased.

We emphasize that, according to the criteria of the 1990 ACR, in order to have a diagnosis of FM, it was necessary to feel palpation pain in 11 of 18 tender points, with an approximate pressure of 4 Kgf/cm². Considering the volunteer of this case report, after the intervention of the exercise associated with VR, she had 14 pain points before the intervention and 8 pain points, what suggests an improvement in her pain pressure.
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Table 1. Results of VAS and the questionnaires before and after intervention

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
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<tbody>
<tr>
<td>FIQ</td>
<td>64.18</td>
<td>53.27</td>
</tr>
<tr>
<td>FCQ</td>
<td>43</td>
<td>38</td>
</tr>
<tr>
<td>VAS</td>
<td>60</td>
<td>25</td>
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<tr>
<td>VAS</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 1. Results of VAS and the questionnaires before and after intervention

PQ, Fibromyalgia Impact Questionnaire; FCQ, Functional Capacity Questionnaire; FSS, Fatigue Severity Scale; VAS, visual analogue scale.

threshold. However, this would not exclude FM diagnosis since the current criteria consider the generalized pain index and the severity scale of the symptoms.2

Several studies evaluated the benefits of VR for the treatment of FM10,12,13 and have concluded that the application of VR brings short- and long-term benefits in improving pain, improving disability and quality of life, corroborating with the results found in this study. However, these studies had as their primary outcome the effect of VR on memory, depression, and negative and positive emotional involvement, as well as coping skills, that is, the focus of VR was on the psychological and cognitive effects of the disease. In addition, none of these studies associated the VR protocol with physical exercise.

Although a direct influence of the treatment protocol on the pain of the volunteer assessed by the VAS was not observed, the impact over the perception of pain of the volunteer. This may be considered a result of great importance, considering that one of the main reasons for the low adherence to treatment is the catastrophic pain.4 In addition, Estévez-López11 study showed that subjective physical function in women with FM is more affected than their objective function, and this is associated with high catastrophic pain results, that is, the greater the catastrophic pain, the greater the disagreement between subjective and objective physical function. Thus, the decrease in the Pain Catastrophizing Scale score shows that the proposed treatment could promote a positive feeling of ability to perform ADLs.

As a conclusion, a rehabilitation program for people with FM that involves VR added to the practice of physical exercises contributed to the improvement of the cognitive and physical aspects of the patient. The association of these two therapies was beneficial, since cognitive stimuli and the practice of a physical activity were able to promote improvement in the function, the fatigue, the quality of life and the perception of pain of these individuals. In this context, future, controlled and randomized studies are suggested to verify the efficacy of VR in the rehabilitation of women with fibromyalgia.

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REFERENCES


