WWJMRD 2021; 7(2): 35-37
www.wwjmrd.com
International Journal
Peer Reviewed Journal
Refereed Journal
Indexed Journal
Impact Factor SJIF 2017: 5.182 2018: 5.51 / ISI 2020-2021: 1.361
E-ISSN: 2454-6615

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Ask your dentist: Does virtual reality support treatment? A Preliminary survey. Part I

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Abstract
Introduction. Despite advances in dental treatment, people avoid dental care because of pain, fear or anxiety. Distraction techniques such as television watching, listening to music, use of audio-visual eyeglasses, may effectively help to distract the patient's attention away from anxiety. Virtual Reality is a premedication tool utilized more common in medicine. Objective. Aim of this study was a preliminary questionnaire about relaxation of virtual reality after dental treatment. Materials and methods. 20 adult patients have been qualified for the anonymous original questionnaire about postoperative quality sense with or without Oculus Go virtual reality relaxing movie. During the first call, after the direct restorative treatment in local anaesthesia has been completed, no virtual reality has been used, while after the second appointment there has been utilized a post-treatment screening with relaxing movie. Results. 19/20 patients responded positively to the use of virtual reality. Conclusion. The responses to the questionnaire confirm the preliminary advisability of using VR after treatment. Further research is necessary in order to develop or introduce virtual reality during dental operations.

Keywords: dentistry, distraction, virtual reality

Introduction
According to World Health Organization, statistics shows that more than 60% of school-age children worldwide and nearly 100% of adults have dental caries status (1) which makes this infectious disease a permanent condition of pandemic in humanity, leading, when untreated, to serious general complications (2-5).
Over the course of several thousand years, mankind has made a huge evolutionary leap, which also applies to development of alloplastic materials for dental restorations, starting with natural resources to fill holes in teeth with bitumen or beeswax, to sophisticated contemporary glass-ionomer, composite, 3D-print zirconia and nature-inspired design, to truly restore lost function, biological identity and natural appearance (6-11). Despite achievements in dental treatment, people avoid dental care, generally because of pain, fear/anxiety, disinformation, phobia or fear of the unknown (12-16).
Psychological factors play a role in the experience and treatment of pain and can be explained in several theories, i.e. cognitive-affective attention (17), multiple resource model of attention (18), capacity model of attention (19) or gate control (20, 21).
For alleviating pain or anxiety dental clinicians have used available tell-show-do, positive reinforcement, relaxation, systematic desensitization, biofeedback, live modelling, contingent escape, mouth prop, voice control, physical restraints, hand-over-mouth exercise, conscious sedation, audio analgesia, deep breathing exercises, hypnosis, behaviour rehearsal. (22-25). Hypnotisability has been first described as a trait measure that assesses a person's ability to be hypnotized. Virtual reality hypnosis may capture attention in those that have trouble with imagination and absorption. The illusion of going inside the three-dimensional computer generated environment is known as 'presence' (26). There is a growing interest in patients, their families, and medical staff to alternatively replace or help traditional sedation, analgesia, anaesthesia. In this term virtual reality (VR) seems to be a promising tool in search of the ideal distractor involving multiple sensory modalities (visual, auditory, olfactory or kinaesthetic) (27-34).

Materials and Methods

On May 17, 2020, The World Telecommunication and Information Society Day, we have started the 24 weeks lasting questionnaire survey with the use of *Oculus Go* VR HS (Facebook Technologies, Menlo Park, CA, USA). This preliminary inquiry looked at the patient's answers of the Oculus Go effect on reducing unpleasant sensations after standard direct restorative treatment in local anaesthesia, for encouraging to the next appointment.

20 generally healthy adult patients, 10 female and 10 male, in the age range of 25-54, have given voluntary consent to the anonymous form on request. Patients have not been informed what will happen next time, to reduce suggesting. Each of them has been given a shit of paper with a question and single-choice three answers on each side for the first and second visits, respectively. During the first call, after the direct restorative treatment in local anaesthesia has been completed, no VR has been used, while after the second appointment we have utilized a post-treatment screening of a 12'39'' *Conscious existence* movie by Mark Zimmermann, in a patient sitting position (Fig 1). The movie is free and commonly available on the Veer community portal. This is a cinematic virtual reality short film experience with intention to be a journey within that hopefully will touch you in an emotional level and make transcend into a relaxed and appreciative state of mind.

The question has been stated: 'How do you feel after treatment?' We have proposed a 3-point scale, where '0' has meant 'I want to get out of the chair as soon as possible, even though it has not hurt. I have nothing against you. I will come again because I know I have to finish the planed treatment'; '1' has meant 'It has been okay, it has not hurt. See you soon' and '2' has meant 'I feel relaxed, I do not want to leave the chair. I will gladly come again'. Patients have been asked to store a survey shit discreetly until the next time, and have thrown their marked answers into a closed box after the second visit, which we have opened after completing the survey, and have given codes from A-W to each of 20 patients.

Results

The preliminary patient's answers are collected in preliminary table (Tab 1). The distribution of responses has been closely similar in both genders. Mostly (17/20), patients have expressed moderate opinions with score '1', while not subjected to post-treatment VR; two patients have answered '0'. Answers for most patients (19/20) after using VR after treatment have scored '3'. 'M' coded patient's answer scored '2' in group without VR has been different; maybe it has been just a mistake or a specific preference; the same patient has given an opinion score '1' after VR on the second appointment. It can be ruled out this individual predisposition, perception or maybe uncertainties in front of the unknown have been of importance.

Fig. 1: Patient code R during Oculus Go VR immersion after treatment.

Table. 1: Patients opinion without or with the use of VR after treatment.

Patient code	No post-treatment VR	Post-treatment VR
A	1	2
B	1	2
C	1	2
D	1	2
E	1	2
F	0	2
G	1	2
H	1	2
I	1	2
J	1	2
K	1	2
L	1	2
M	2	1
N	1	2
O	0	2
R	1	2
S	1	2
T	1	2
U	1	2
W	1	2

Tab 1 Patient's answers without or with the use of VR after treatment.

Fig 1 Patient code R during Oculus Go VR immersion after treatment.

References

1. T-K Huang, Ch-H Yang, Y-H Hsieh, J-Ch Wang, Ch-Ch Hung, "Augmented reality (AR) and virtual reality (VR) applied in dentistry", Kaohsiung J Med Sci 2018, 34, 243e248.
2. T.F. Murphy, S. Sethi. "Bacterial infection in chronic obstructive pulmonary disease", Am Rev Pulm Dis, 1992, 146, 1067-84.
3. L.S. Miller, M.A. Manwell, D. Newbold, M.E. Reding, A. Rasheed, J. Blodgett, K.S. Kornman. "The relationship reduction in periodontal inflammation and diabetes control: a report of 9 cases", J Periodontol, 1992, 63(10), 843-8.
4. I. Eli. "Dental anxiety: a cause for possible misdiagnosis of tooth vitality", Int Endod J, 1993, 26(4), 251-253.
5. J. Beck, R. Garcia, G. Heiss, P. Voconas, S. Offenbacher. "Periodontal disease and cardiovascular disease", J Periodontol, 1996, 67, 1123-37.

6. G. Oxilia, F. Fiorillom, F. Boschin, E. Boaretto, S.A. Apicella, Ch. Matteucci, D. Panetta, R. Pistocchi, F. Guerrini, C. Margherita, M. Andretta, R. Sorrentino, G. Boschian, S. Arrighi, I. Dori, G. Mancuso, J. Crezzini, A. Riga, Mc Serrangeli, A. Vazzana, P.A. Salvadori, M. Vandini, C. Tozzi, A. Moroni, R.N.M. Feeney, J.C. Willman, J. Moggi-Cecchi, S. Benazzi. "The dawn of dentistry in the late upper Palaeolithic: An early case of pathological intervention at Riparo Fredian", Am J Phys Anthropol, 2017, 163(3), 446–461.
7. F. Bernardini, C. Tuniz, A. Coppa, L. Manicic, D. Dreossi, D. Eichert, G. Turco, M. Biasotto, F. Terrasi, N. de Cesare, Q. Hua, V. Levchenko. "Beeswax as Dental Filling on a Neolithic Human Tooth", PLoS One 2012, 7(9), e44904.
8. J.L. Ferracane. "Resin composite – state of art", Dent Mater, 2011, 27, 29-38.
9. G.J. Mount. "Clinical performance of glass-ionomers", Biomaterials, 1998, 19, 573- 579.
10. P.F. Manicone, P.R. Iommetti, L. Raffaelli. "An overview of zirconia ceramics: Basic properties and clinical applications", J Dent, 2007, 35, 819-826.
11. A.S. Perera, M.O. Coppens "Re-designing materials for biomedical applications: from biomimicry to nature-inspired chemical engineering", Phil Trans R Soc, 2018, 377: 1-21.
12. P.A. Doerr, W.P. Lang, L.V. Nyquist, D.L. Ronnis. "Factors associated with dental anxiety", JADA, 1998, 129, 1111-9.
13. D. Locker. "Psychosocial consequences of dental fear and anxiety", Community Dental Oral Epidemiol, 2003, 31,144–151.
14. S. Lindsay, C. Jackson. "Fear of routine dental treatment in adults: its nature and management", Psychol Health, 1993, 8(2, 3), 135-153.
15. A. Arntz, M. van Eck, M. Heijmans. "Predictions of dental pain: The fear of any expected evil is worse than the evil itself", Behav Res Ther, 1990, 28, 29-41.
16. E. Fernandez, D.C. Turk. „The utility of cognitive coping strategies for altering pain perception: a meta-analysis", Pain, 1989, 38, 123-135.
17. K.D. McCaul, J.M. Mallot. "Distraction and coping with pain", Psychol Bullet, 1984, 95, 516-533.
18. C.D. Wickens. "Processing resources in attention", In R. Parasurman, D.R. Davies (Eds.), "Varietes of attention", Orlando, Fl 1984, 63-102.
19. C. Eccleston, G. Crombez. "Pain demands attention: a cognitive-affective model of the interruptive function of pain", Psycholog Bullet, 1999, 125(3), 356-366.
20. R. Melzack, P.D. Wall. "Pain mechanism: A new theory", Sci, 1965, 150, 971-979.
21. D.R. Patterson, J.J. Everett, G.L. Burns, J.A. Marvin. "Hypnosis for the treatment of burn pain", J Consul Clin Psychol, 1992, 60, 713–717.
22. L.J. Siegel, L. Peterson. „Stress reduction in young dental patients through coping skills and sensory information", J Consult Clin Psychol, 1980, 48, 785-787.
23. S.M. Lawrence, D.J. McTigue, S. Wilson, J.G. Odan, W.F. Waggoner, H.W. Jr Fields. "Parental attitude towards behaviour management techniques used in paediatric dentistry", Paediatric Dent, 1991,13, 151-5.
24. B. Bentsen, P. Svensson, A. Wenzel. „Evaluation of effect of 3D video glasses on perceived pain and unpleasantness induced by restorative dental treatment", Eur J Pain, 2001, 5(4), 373-378.
25. Y.S. Schmitt, H.G. Hoffman, S.R. Sharar. „A randomized, controlled trial of immersive virtual reality analgesia during physical therapy for paediatric burn injuries", Burns, 2011, 37, 61–68.
26. E.R. Hilgard, J.R. Hilgard. „Hypnosis in the Relief of Pain", Los Altos, CA: William Kaufmann, Inc, 1975.
27. M. Florella, C. Sarale, R.D. Ram RD. "Audio-visual iatrosedation with video eyeglasses distraction method in paediatric dentistry: case history", J Int Dent Med Res, 2010, 3(3), 133-136.
28. H. Leventhal. "I know distraction works even though it doesn't." Health Psychol, 1992, 11, 208–209.
29. C.L. Frere, R. Crout, J. Yorty, W. McNeil. "Effects of audio-visual distraction during dental prophylaxis", J Am Dent Assoc, 2001, 132, 1031-38.
30. T.('T') Kupka. "Patiens meus. ISMWC – T-909.437.748-7", ZAiKS, 1323392, 2003.
31. N. Sivakumar, M. Abinash, S.V.S.G. Nirmala, S.A. Bailwad. "Effectiveness of Music Distraction in the management of Anxious Paediatric Dental Patients", Annales Essences Dent, 2010, 2(2), 1-5.
32. D. Ram, J. Shapira, G. Holan, F. Magora, S. Cohen, E. Davidovich. "Audio-visual video eyeglass distraction during dental treatment in children", Quintessence Int, 2010, 41(8), 673-679.
33. C. Sullivan, P.E. Schneider, R.J. Musselman, C.O. Dummett, D. Gardiner. „The effect of virtual reality during dental treatment on child anxiety and behaviour". J Dent Child, 2000, 67, 193–96.
34. L.M. Dahlquist, K.D. McKenna, K.K. Jones, L. Dillinger, K.E. Weiss, C.S. Ackerman. "Active and passive distraction using a head-mounted display helmet: Effects on cold pressor pain in children". Health Psychol, 2007, 26, 794–801.