

Case Report

Unilateral Blindness in a Patient Following Root Canal Treatment

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Abstract

Root canal treatment is a dental procedure that relieves pain caused by an infected or abscessed tooth. It is one of the safest and most successful dental procedures. However, the patient may face unexpected complications during or after the procedure in certain rare conditions. The ocular complication is among these conditions.

In the present work, we present a case of a 45-year male patient who suffered from pain and unilateral blindness after root canal treatment. He was referred to Basir eye clinic for a visual evoked potential test as part of his eye examination to reach an accurate diagnosis.

Keywords: Root Canal Treatment; Unilateral Blindness; Visual Evoked Potential.

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Introduction

Root canal treatment is a dental procedure to replace a tooth's damaged or infected pulp with a root filling. This procedure is usually safe; however, like any other medical procedure, it may accompany certain complications. Common complications include tooth color changes, sinus congestion, reinfection, and tooth cracking.

Ocular complications are among the accidents patients may suffer after the procedure. The ocular complication is common in oral procedures, including root canal treatment. Diplopia, ptosis, blurry vision, miosis, vision loss, and amourosis are the visual complications observed in different oral procedures¹. These complications can be because of the administration of local anesthesia or the extension of dental infection from maxillary teeth or other neighboring structures to orbit space and tissues surrounding the eyes².

Visual evoked potential (VEP) is the potential evoked in the visual cortex by light stimulation of the visual system. VEP is used in different pathological and physiological conditions of the visual system.

Sarzaeim F. et al. (2022) worked on the side effects of anti-seizure medication on the visual system, mainly the visual pathway of the patient suffering from a seizure, using the VEP technique. They observed delay in VEP and P100 peak of the patient compared with the normal population, and thereby, they concluded that anti-seizure medication affects the visual pathway of patients, which can be diagnosed by VEP³. Chen J.Y et al. (2006) performed research on the utility of multifocal VEP (mfVEP) and multifocal electroretinogram (mfERG) in retinal diseases, including branch retinal arterial occlusion. Their work resulted in pathological changes of mfVEP and mfERG, proving VEP's usefulness

in retinal disease⁴.

Finally, VEP is a suitable technique for those who have blindness. In this connection, Shushtarian S. M. et al. (2020) reported a case of total blindness following anaphylactic shock due to Co-amoxiclav treatment. They used flash VEP and concluded that visual pathway disturbance in the patient⁵. Much literature favors applying VEP in different visual system abnormalities⁶⁻²⁰.

Based on the above-detailed survey of the literature, the authors decided to perform flash VEP along with several related tests necessary to diagnose the probable reason in case of the patient undergone unilateral blindness after root canal treatment.

Case report

A 45-year-old male subject was referred to the eye clinic for a visual evoked potential (VEP) test. He had unilateral blindness in his left eye, whereas his right eye had normal visual acuity. His medical history showed that he consulted a dentist one year ago and underwent root canal treatment due to tooth pain. After the treatment, he felt left eye pain, for which he consulted an ophthalmologist. The ophthalmologist started treatment, but the result was negative, and after ten days of root canal treatment, he lost his left eye vision entirely. His VEP test was normal in the right eye (latency of VEP, P100 peak was 99 m/sec), but no signal could be recorded for the left eye. He was examined for ocular problems by the collection of different tests necessary for this episode, and finally, branch retinal arteritis occlusion was diagnosed.

Discussion

A 45-year-old male with blindness in his left eye due to root canal treatment was diagnosed with branch retinal arteritis occlusion. The following literature may be discussed related


to the findings of the present case report. In 2014, Ogurel T and his team documented a closely related case. They discussed a 51-year-old female who consulted an eye clinic due to a sudden, painless vision loss in her left eye, which occurred post a tooth extraction two years prior. Examination revealed her left eye had a best corrected visual acuity of 6/30. Furthermore, a fundus examination showed a peripapillary flame-shaped hemorrhage and a pale retina in the temporal arcuate. No issues were detected in her right eye. After thorough examination of the patient's eyes, the team deduced that the vision impairment resulted from a branch retinal artery occlusion²¹. Handschel J et al. (2011) stated that orbital pain could be provoked by disease of the orbital skeleton, and the maxillary dental infection or root canal treatment represents the majority of these cases, followed by injuries of the orbital skeleton²². In 2018, Khattab M. H and colleagues described an instance where a 38-year-old individual experienced diminished vision in the left eye shortly after being administered intraoral local anesthesia. The identified condition was cilioretinal artery occlusion accompanied by swelling of the optic disc. Remarkably, by the end of ten weeks, the person's visual clarity improved to 20/20 and the swelling had diminished. While there are several theories proposed in the literature regarding the ocular complications post-intraoral local anesthetic use, the specific cause is yet to be determined. The prevailing opinion in this particular case is an unintentional intravascular injection²³. Zas M. et al. (2021) reported a 26-year-old male patient with visual impairment in the right eye two days after a dental procedure. The cause for visual impairment was inadvertent intravenous injection. Six months later, he completely restored previous visual acuity,

although he had not received any treatment¹.

Conclusion

Root canal treatment may create blindness due to either anesthetic or infection, which is to be considered by the dentist to manage the emergency to handle the episode risk.

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References

1. Zas M, Mendaro M, Schiantarelli P, Cotic M, Chiaradía P. Unilateral visual impairment after a dental procedure: Case report. *Archivos de la Sociedad Española de Oftalmología (English Edition)*. 2021;96(12):649-52.
2. Chhabra V, Chhabra A. Blindness! A terrible aftermath of dental treatment. *Dental Journal of Advance Studies*. 2014;2(02):064-73.
3. Sarzaeim F, Abdolalizadeh S, Shushtarian SMM, Shojaei A. Visual Evoked Potential Findings in Patients using Anti-Seizure Medicine. *Journal of Ophthalmology and Research*. 2022;5(3):123-6.
4. Chen JY, Hood DC, Odel JG, Behrens MM. The effects of retinal abnormalities on the multifocal visual evoked potential. *Investigative ophthalmology & visual science*. 2006;47(10):4378-85.
5. Shushtarian SMM, Dastjerdi MV. Total Blindness Following Anaphylactic Shock due to Co-Amoxiclav Treatment. *Journal of Ophthalmic and Optometric Sciences*. 2020;4(4).
6. Shushtarian S, Kalantari AS, Tajik F, Adhami-Moghadam F. Effect of occupational vibration on visual pathway measured by visual evoked potentials. *Journal of Ophthalmic and Optometric Sciences*. 2017;1(5):7-11.

7. Shushtarian S, Yahyavi S. Study of visual evoked potentials during normal monthly cycle in normal female subjects. *Biomedical sciences instrumentation*. 1999;35:165-7.
8. Keramti S, Ojani F, Shushtarian SMM, Shojaei A, Mohammad-Rabei H. Early Diagnosis of Pathological Changes in Visual System of Prolactinoma Patients Using Visual Evoked Potential. *Journal of Ophthalmology and Research*. 2021;4(3):289-93.
9. Ojani F, Shushtarian SMM, Shojaei A, Naghib J. Visual Evoked Potential Findings of Bardet-Biedl Syndrome. *Journal of Ophthalmology and Research*. 2021;4(3):254-7.
10. Sarzaeim F, Hashemzahi M, Shushtarian SMM, Shojaei A, Naghib J. Flash Visual Evoked Potential as a Suitable Technique to Evaluate the Extent of Injury to Visual Pathway Following Head Trauma. *Journal of Ophthalmology and Research*. 2022;5(1):0-.
11. Sarzaeim F, Hashemzahi M, Shushtarian SMM, Shojaei A. Visual Evoked Potential Findings in Road Drilling Machine laborers. *Journal of Ophthalmology and Research*. 2022;5(1):43-7.
12. Allahdady F, Amiri MA, Shushtarian SMM, Tabatabaee SM, Sahraei F, Shojaei A, et al. Comparison of visual evoked potential and electro-oculogram tests in early detection of hydroxychloroquine retinal toxicity. *Journal of Ophthalmic and Optometric Sciences*. 2016;1(1):19-26.
13. Naser M, Shushtarian SMM, Shojaei A, Adlami-Moghadam F. Visual Disturbance in a Patient with Amiodarone Treatment Following Refractive Surgery. *Journal of Ophthalmic and Optometric Sciences*. 2017;1(3):39-42.
14. Shushtarian SMM, Shojaei A, Adhami-Moghadam F. Visual Evoked Potentials Changes among Patients with Chronic Mustard Gas Exposure. *Journal of Ophthalmic and Optometric Sciences*. 2018;2(2018):6-9.
15. Shushtarian SMM, Adhami-Moghadam F, Naser M, Shojaei A. Severe Headache Initiated by Flash Stimulation during Visual Evoked Potential Recording in a Patient with Monocular Optic Neuritis and History of Migraine Headache. *Journal of Ophthalmic and Optometric Sciences Volume*. 2017;1(4).
16. Shushtarian SMM. Suitable Stimulation Technique to Record Visual Evoked Potential in Migraine Patients. *Journal of Ophthalmic and Optometric Sciences Volume*. 2020;4(2).
17. Hajibeygi R, Shushtarian SMM, Abolghasemi S. Visual Evoked Potential Findings of Sjogren's Syndrome. *Journal of Ophthalmic and Optometric Sciences*. 2020;4(1):13-7.
18. Sarzaeim F, Ojani F, Hojati TS, Shojaei A, Shushtarian SMM. Effect of Hand-Arm Vibration on Retina of Road Drilling Machine Laborers Measured by Electroretinography. *Journal of Ophthalmology and Research*. 2022;5(2):81-5.
19. Shushtarian SMM, Tajik F, Abdolhoseinpour H. Measurement of Visual Evoked Potentials in Patients with Spastic Cerebral Palsy. *J Ophthalmic Optom Sci*. 2018;2:10-3.
20. Shushtarian SMM, Mazar RP, Fadaeifard S. Visual Evoked Potential Recording in a Fatigued and Drowsy Patient under Anti-Seizure Medicine Treatment. *Journal of Ophthalmic and Optometric Sciences*. 2021;5(1).
21. Oğurel T, Onaran Z, Oğurel R, Örnek N, Büyüktortop Gökçinar N, Örnek K. Branch retinal artery occlusion following dental extraction. *Case reports in ophthalmological medicine*. 2014;2014.
22. Handschel J, Naujoks C, Zimmermann A. Orbital pain from a cranio-maxillofacial surgery perspective. *Der Ophthalmologe*. 2011;108:1134-8.

23. Khattab MH, Wiegand A, Storch M, Hoerauf H, Feltgen N. Unilateral Vision Loss after a Dental Visit. Case Reports in Ophthalmology. 2018;9(1):209-14.

Footnotes and Financial Disclosures

Conflict of interest:

The authors have no conflict of interest with the subject matter of the present manuscript.

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