Received: 26 July 2021 | Revised: 25 September 2021 | Accepted: 29 September 2021

DOI: 10.1111/scd.12666

CASE REPORT

WILEY

Pulp chamber opening alternative in pulpectomies in a child with Wolff-Parkinson-White syndrome. A case report

Mirella Francis Vilca Velazco[1] | **Lenny Lavado García**[2] | **Gilmer Torres Ramos**[3] | **Roxana Patricia López Ramos**[4]

[1] Faculty of Dentistry, Universidad Nacional Mayor de San Marcos, Lima, Peru

[2] Faculty of Dentistry, Universidad Nacional Mayor de San Marcos, Lima, Peru and Dentistry Department, Instituto Nacional de Salud del Niño, Lima, Peru

[3] Director of Postgraduate Unit of Dentistry, Faculty of Dentistry, Universidad Nacional Mayor de San Marcos, Lima, Peru

[4] PhD(c) Epidemiology Research, Faculty of Public Health and Administration, Universidad Peruana Cayetano Heredia, Lima, Peru

Correspondence
Roxana Patricia López Ramos, Faculty of Public Health and Administration, Universidad Peruana Cayetano Heredia. Avenue Honorio Delgado 430, San Martín de Porres, Peru.
Email: roxana.lopez.r@upch.pe

Abstract

Background: Wolff-Parkinson-White syndrome is a congenital abnormality of the heart. Patients with this syndrome and multiple dental caries with pulp exposure may require comprehensive dental treatment under general anesthesia. Pulpectomy is performed in primary teeth with pulp expose. This treatment in anterior teeth requires palatal access and the majority there is no good visibility, requiring more time to perform. Therefore, this case aimed to demonstrate a pulp chamber opening alternative in pulpectomies in a child with Wolff-Parkinson-White syndrome.

Case Presentation: A 3-year-old female patient with Wolff-Parkinson-White syndrome and multiple dental caries with reversible pulpitis in anterior upper teeth. The dental treatment was performed under general anesthesia. Due to abundant hemorrhage in anterior upper teeth, pulpectomies were performed, which pulp chamber openings were modified by labial and the treatment itself was completed. After, these teeth were rehabilitated with direct restorative veneers using light-curing composite resin. The follow-up at 12 months showed an absence of evidence clinic and radiographic.

Conclusion: This case demonstrated the pulp chamber opening performed by labial in pulpectomy is an effective and viable alternative to reduce operative time and improve visibility in pulpotomies in a child with Wolff-Parkinson-White syndrome.

KEYWORDS
child, dental caries, endodontics, heart disease, syndrome

1 | INTRODUCTION

Wolff-Parkinson-White syndrome (WPWS) presents a conduction disorder heart caused by an accessory pathway that produces tachyarrhythmias. The prevalence is approximately 0.07% of the population, and many patients present palpitations as the main complaint.[1] Besides, the patients may experience dizziness, syncope, congestive heart failure, or sudden cardiac death.[1] Also, they are in a constant stress-induced threat due to increased heart rate and systemic vascular resistance.[2] In some patients, the first and only manifestation of the disease is sudden cardiac death.[2,3]

One main reason for dental visits of heart disease patients is the presence of dental caries, as well as good oral health in heart disease patients brings important benefits

© 2021 Special Care Dentistry Association and Wiley Periodicals LLC

for their condition and it helps to support heart surgery.[4] Thus, the patient with multiples dental caries is indicated comprehensive dental treatment under general anesthesia. It is indicated in children below 14 years of age with multiple morbidities and lack cooperation. In addition to this, for a patient with a systemic disease under medical treatment is important to reduce the operative time and avoid any possible complications.[4,5]

Dental caries might be one of the most prevalence oral diseases has patients with heart disease. This oral disease is not treated, can affect the pulp tissue,[5,6] aggravating the systemic status.[7] Then, the treatment pulp performed in primary teeth is the pulpectomy. It is indicated in teeth with irreversible or necrotic pulpitis and when it was initially indicated for pulpotomy but exists excessive bleeding, the maintenance of the root pulp is contraindicated.[8]

The objective of pulpectomy is to preserve the primary teeth without symptoms until they are replaced by their successor naturally. This treatment includes the chemical and mechanical removal of the inflamed or necrotic pulp tissue, followed by filling with a material that can be resorbed at the same rate as the primary teeth. In this way, this type of treatment contributes to preserving the length of the arch, restoring the chewing function, aesthetics, preventing harmful habits of the tongue and speech disorders,[9] and improving quality of life for the patient.[5]

Dental treatments in children demand to be short-term, however, pulpectomies are complex and time-consuming treatments. In the anterior superior sector for the chamber opening is necessary to establish chamber access in a straight line to guarantee improved, direct visibility and a decrease in the time in the circulation of the instrument. Thus, buccal access to the root canal preserves the intact functional palatal surface without interruptions,[10,11] reducing the possibility of dental fracture, and presenting a successful dental restoration. Therefore, this case aimed to demonstrate an alternative of the opening of the pulp chamber in pulpectomies in a child with WPWS.

2 | CASE REPORT

Three-year-old female, from the city of Puno in Peru, came accompanied by her mother to the service of Medically Compromised Patients of the Dentistry Department of the Instituto Nacional del Niño in Lima, Peru. They came by inter consultation of the Cardiology service, the child had diagnosis WPWS and require dental treatment for multiple dental caries.

Pathological antecedents: term delivery, her weight and height at birth were 3500gr and 56 cm respectivamently, complete prenatal check-ups. At 15 days of age, in her growth and development control, cardiac arrhythmia was detected, which was confirmed with an electrocardiogram, then she was referred to Instituto Nacional de Salud del Niño in Lima, Peru. The Cardiology service diagnosed to child with WPWS, and since then she has received treatment with propranolol[12] (doses: 1 mg/kg/day every 8 h). The mother did not report previous surgical operations on her child. Family history: his parents and older sister show an apparent good general condition. The child has a stable family nucleus, and medium socioeconomic level.



FIGURE 1 Presence of multiple carious lesions on anterior upper teeth

2.1 | Oral clinical examination

The extraoral examination revealed a patient with facial symmetry. The intraoral examination presented: gums swollen by the presence of dental plaque, no abscess or fistula, oral mucous pink and moist, and multiple carious lesions cavitated (more 2/3 dentin) and soft consistency in anterior upper teeth (mesio-vestibulo-distal surfaces), and also in posterior teeth (occlusal surfaces) of both arches. These teeth did not have pain spontaneous and neither pain to the horizontal and vertical percussion. Regular oral hygiene. Patient with definitely negative behavior to dental treatment.

2.2 | Dental definitive diagnosis and dental treatment planning

Gingivitis associated with dental plaque, multiple severe dental caries, reversible pulpitis in anterior upper teeth, and first and second molars (Figure 1). Behavior: non-cooperative patient. Due to his behavior, initials X-rays were not taken. Therefore, dental treatment planning was dental prophylaxis, pulpotomies on first and second molars and anterior upper teeth, restorations with light-curing composite resin on molars, direct restoration veneers with light-curing resin composite on anterior upper teeth, and application of fluoride varnish.

Before dental treatment under general anesthesia the mother proceeded to sign the informed consent. Then, auxiliary laboratory tests and inter consultations were performed for assessment and suggestions pediatric, cardiology, and anesthesiology.

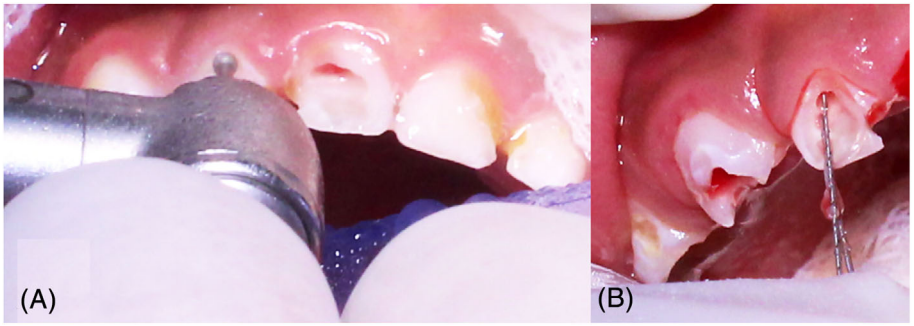


FIGURE 2 (A) Realization pulp chamber opening by labial. (B) Biomechanical instrumentation

The indications of inter consultations were: Pediatric Service indicated Grade II surgical risk, Cardiology Service indicated suspension of medication propranolol 6 days before intervention and premedication with cephalothin as antibiotic prophylaxis 1 h before intervention and 2 h after intervention, and the Anesthesiology Service indicated to use Sevorane as intraoperative anesthetic. In addition, auxiliary laboratory tests presented normal values.

The child was hospitalized 48 h pre and post-surgery for controlling vital functions and their disease. In this way to minimize possible complications and also was administrated antibiotic prophylactic therapy indicated by cardiology, ensuring that no risk of bacteremia.

In the operating room, the induction period was used oral midazolam 0.5 mg/kg to decrease anxiety.[13] Dental treatments were carried out according to treatment planning. However, treatment of upper anterior teeth was modified. For the reason that removal carious tissue (mesio-vestibulo-distal faces) were visualized pulp involvement and abundant bleeding, therefore pulpectomies were performed in these teeth.

The specific procedure is described below: Chamber pulp opening by labial was performed with a round bur (# 012), and to eliminate mesial and distal horns; then with a bullet bur (# 014) was made the internal bevel in the buccal curve (Figure 2A). Root resection was with a barbed broach. Working length radicular was determined on age.[14] It continued with biomechanical instrumentation and was carried out with k-file from # 35 to # 80 (Figure 2B)., the irrigation was with 0.12% chlorhexidine digluconate, Root canal was dried with sterile paper cones and finally, it was sealed with zinc oxide eugenol (ZOE). Access cavity was sealed with resin-modified glass ionomer. The buccal surfaces were restored using direct restorative veneers made with light-curing composite resin.

Afterwards postoperative control was positive. The first control was at third day and it evidenced absence of spontaneous pain, sensitivity, swelling or mobility; better oral hygiene was appreciated. The mother was instructed to maintain good oral hygiene habits,[15] a soft diet and to avoid tearing food to avoid fractures and possible recurrences.

The second control was at three months where the absence of symptoms was evidenced. The third control was going to be at 6 months but due to the COVID 19 pandemic, she could not attend. Subsequently it was at 12 months, a panoramic radiograph was taken Radiolucent images were absent in the periapical region (Figure 3). The mother reported that the girl had no pain or discomfort (Figure 4) and she was indicated for a periodic check-up every 3 months.

3 | DISCUSION

Patients with WPWS who need to undergo invasive non-cardiac procedures are at high risk,[16] added to anxiety about dental treatment and little or no collaboration, for which they require stress management due to the risk of death sudden.[2] For this reason, an alternative is the treatments under general anesthesia in a surgical center, in collaboration with specialists to reduce the high risk of perioperative arrhythmias.[13] Another consideration is the use local anesthetics, these containing epinephrine and as well as sympathomimetics administered during dental treatment can have significant effects in patients suffering from tachyarrhythmias.[2] In consequence the present case was performed under general anesthesia.

Anterior upper primary teeth are the most affected by caries in the primary dentition.[7] When these teeth have exposure pulp, one of pulp treatments to perform is the pulpectomy. In the present case, this treatment was chosen due to clinical condition of abundant bleeding and to avoid future complications, if a possible failure will happen, a new treatment under general anesthesia is complex and high-risk due to her age and systemic condition.[5]

Traditionally, in anterior teeth is performed palatal cameral opening, it no affects the unaesthetic appearance of previously available restorative materials. However, this concern is overcome with the availability of new highly



FIGURE 3 Panoramic X-ray at 12 months post-treatment



FIGURE 4 Rehabilitation anterior superior sector post-treatment

aesthetic restorative materials. On the other hand, the surface most affected by caries in the anterior upper teeth is the labial and the least affected is the palatal.[11] Therefore, it is better eliminate the carious lesion and obtain access to the root canal through labial Surface. In this manner preserving the intact functional palatal surface, which also provided a direct vision and reducing operative time.[11]

Anatomical studies have shown that the endodontic approach in labial surface provides more linear access to the ápex.[11] Therefore, it is more desirable than a palatal approach. Chae et al.[17] suggested tooth structure is les removed in primary incisors during labial access cameral that palatal access, which could weaken the tooth and increase the possibility of dental fracture. In this report, chamber pulp opening was through the labial surface, preserving intact the functional palatal surfaces. This alternative allowed an improvement in the direct visibility of the root canal, reduced operative time, and facilitating the use of instruments endodontics.[17]

Nowadays, aesthetics plays pediatric patients an important role.[10] For this reason, the case present was rehabilitated with direct restoration veneers with light-curing composite resins, an alternative to the classic crowns. In this case, was unnecessary because the palatal surface was intact, due to the modified chamber opening that was made by labial, preserving the greatest amount of healthy tooth structure.

The scientific evidence on WPWS is scarce, specially about guidelines or protocols for dental treatment, hence the justification for this report is addresses up-to-date clinical aspects in the dental management of pediatric patients with congenital heart disease. The present case allow to show the reduction of risk associated with dental surgery time, through pulp treatments modified such as the opening by labial in anterior upper teeth.

4 | CONCLUSIONS

The present case demonstrated the chamber opening technique by labial in pulpectomies of anterior upper teeth, in a child with WPWS. This technique is a viable alternative to reduce the operative time of pulp therapy, which allowed rehabilitation with direct restoration veneers with light-curing composite resin, improvising masticatory and aesthetic function. In the follow-up at 12 months, observed absence of evidence clinic and radiographic.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

CONSENT APPROVAL

The parents of patient gave permission to use clinical information and photographic material.

ORCID

Mirella Francis Vilca Velazco https://orcid.org/0000-0003-1800-8839
Lenny Lavado García https://orcid.org/0000-0002-8021-0563

Gilmer Torres Ramos https://orcid.org/0000-0002-2590-6736

REFERENCES

1. Cain N, Irving C, Webber S, Beerman L, Arora G. Natural history of Wolff-Parkinson-White syndrome diagnosed in childhood. *Am J Cardiol*. 2013;112(7):961-965.
2. Kesler K, Lahham S. Tachyarrhythmia in Wolff-Parkinson-White syndrome. *West J Emerg Med*. 2016;17(4):469-470.
3. Coban-Akdemir ZH, Charng WL, Azamian M, et al. Wolff-Parkinson-White syndrome: de novo variants and evidence for mutational burden in genes associated with atrial fibrillation. *Am J Med Genet A*. 2020;182(6):1387-1399.
4. IAPD. Foundational articles and consensus recommendation: beharviour guidance in paediatric dental patients; 2021. Accessed March 23 2021. https://iapdworld.org/
5. Rogers JP, Stewart PR, Stapleton JV, Hribar DL, Adams P, Gale AE. An interdisciplinary approach to the management of complex medical and dental conditions. *Aust Dent J*. 2000;45(4):270-276.
6. Smaïl-Faugeron V, Glenny AM, Courson F, Durieux P, Muller-Bolla M, Fron Chabouis H. Pulp treatment for extensive decay in primary teeth. *Cochrane Database Syst Rev*. 2018;2018(5).
7. Chen X, Liu X, Zhong J. Clinical and radiographic evaluation of pulpectomy in primary teeth: a 18-months clinical randomized controlled trial. *Head Face Med*. 2017;13(1):1-10.
8. Wynne C. Endodontics in systemically compromised patients. *Common Complications in Endodontics*. 1st.. Springer; 2018:263-292. https://doi.org/10.1007/978-3-319-60997-3_12
9. IAPD. Foundational articles and consensus recommendation: therapy pulp for primary and young permanent; 2021.[Accessed March 23 2021]. https://iapdworld.org/
10. Agarwal P, Nayak R, Elangovan G. A predictable aesthetic rehabilitation of deciduous anterior teeth in early childhood caries. *Case Rep Den*. 2018;2018:1742529.
11. Winnier J, Suresh R. A comparative evaluation of a labial approach with a conventional palatal approach for endodontic access in primary maxillary incisors: a pilot study. *Int J Clin Pediatr Dent*. 2020;13(1):53-56.
12. Barton AL, Moffett BS, Valdes SO, Miyake C, Kim JJ. Efficacy and safety of high-dose propranolol for the management of infant supraventricular tachyarrhythmias. *J Pediatr*. 2015;166(1):115-118.
13. Staikou C, Stamelos M, Stavroulakis E. Perioperative management of patients with pre-excitation syndromes. *Rom J Anaesth Intensive Care*. 2018;25(2):131-147.
14. Boj JR, Catalá M, García Ballesta C, Mendoza A, Planells P, Desarrollo y erupción dentaria. *Odontopediatría. La evolución del niño al adulto joven*. 1st. Madrid: Ripano 2011; 69–84.
15. Petroniatis T, Ortu E, Marchili N, Giannoni M, Marzo G, Monaco A. How to maintain the oral health of a child with Wolff-Parkinson-White syndrome: a case report. *J Med Case Rep*. 2014;8(1):1-5.
16. Yıldırım I, Özer S, Karagöz T, et al. Clinical and electrophysiological evaluation of pediatric Wolff-Parkinson-White patients. *Anadolu Kardiyol Derg*. 2015;15(6):485-490.
17. Chae M, Song J, Choi H, Kim S. Labial approach of pulp treatment and resin restoration on discolored necrotic primary anterior tooth. *J Korean Dis Oral Health*. 2014;10(2):84-88.

How to cite this article: Vilca Velazco MF, Lavado García L, Torres Ramos G, López Ramos RP. Pulp chamber opening alternative in pulpectomies in a child with Wolff-Parkinson-White syndrome. A case report. *Spec Care Dentist*. 2021;1–5. https://doi.org/10.1111/scd.12666