



BRIEF COMMUNICATION

Analysis of the Clark technique in endodontic procedures

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ABSTRACT

Introduction: the Clark radiographic technique constitutes an essential diagnostic resource in endodontics, as it enables the localization of additional canals and dental structures with greater clinical precision.

Objective: to evaluate the level of knowledge and perception regarding the Clark technique among dental professionals and students in Ambato.

Methods: an observational, descriptive, cross-sectional study conducted in 2024. The population included 63 professionals and 90 students, with a sample of 50 participants selected by convenience. A five-question survey, previously validated, was applied to obtain information that addressed the studied variables. Descriptive statistical methods were employed for data analysis, while medical ethics were respected.

Results: among professionals, 78 % were familiar with the technique and 67 % had used it, considering it effective in clinical practice. Twenty-two percent reported minimal difficulties in its application. Likewise, 67 % acknowledged its usefulness in other dental treatments. Among students, 66 % were aware of the existence of radiographic techniques for proximal surfaces, but only 32 % recognized its capacity to identify additional canals. Eighty-eight percent expressed willingness to use it in their future practice, and 51 % recognized its usefulness in molars with multiple canals.

Conclusions: solid knowledge and frequent application of the Clark technique were observed among professionals. Students showed theoretical gaps but a high willingness to learn it. The need to strengthen academic and practical training in endodontic radiodiagnosis is highlighted, consolidating the technique as a key tool to improve diagnostic precision and the quality of dental treatment.

Keywords: Dental Pulp Cavity; Diagnosis; Endodontics; Radiography, Dental.

INTRODUCTION

Throughout history, dentistry has been deeply embedded in human life, as it enables individuals to maintain optimal oral health and daily well-being.⁽¹⁾ For successful dental procedures, several factors are crucial—particularly accurate diagnosis, which guides appropriate treatment planning. Achieving this requires meticulous protocols, including highly relevant examinations and imaging studies such as radiographs in endodontics.⁽²⁾

Radiographs are images obtained using X-rays that allow visualization of various dental structures. Their importance lies in their application across all dental treatments, as they complement clinical evaluation by revealing details invisible to the naked eye. Radiographs can also be used throughout treatment to monitor patient progress and changes.⁽³⁾ However, they also present limitations and disadvantages, including radiation exposure, low resolution and dimensionality (especially with inadequate equipment), and image distortion or magnification influenced by X-ray angulation and patient positioning. Therefore, radiographs must be used responsibly to minimize these drawbacks.^(4,5)

Numerous radiographic methods exist—both conventional and digital—with the Clark technique standing out as one of the most important. To understand it deeply, it is essential to know its origins and how it became established in dentistry. This technique is considered a cornerstone because it allows detailed visualization of dental structures from multiple dimensions—superior, inferior, posterior, and anterior—providing critical diagnostic information.⁽⁶⁾ The principle was formulated by Charles Clark in the 1910s and is known as “Same Lingual, Opposite Buccal” (SLOB). In Spanish, it is referred to as the “buccal object rule,” “parallax rule,” or “eccentric projection technique.” It is based on the positional shift of an object in radiographic images when the projection angle is altered, using two periapical radiographs with different horizontal angulations.⁽⁷⁾

This technique is of utmost importance for endodontic treatment, mainly for three characteristic aspects: dissociation of images of multiple canals and roots, localization of perforations, pathological processes, identification and determination of curvatures and overlapping structures. It also allows the separation of radiolucencies and anatomical structures, vestibular-lingual localization, and detection of undiscovered canals.⁽⁸⁾ As is evident, a wide range of processes are carried out through the technique described. However, other typologies are also involved in this area, among which one of the most essential stands out: triangular radiographic tracing or Bramante’s technique, which focuses on accurately identifying the location of resorptions, root curvatures, and any errors caused during endodontic treatment, such as steps, false pathways, and root perforations.⁽⁹⁾

Although this technique has proven to offer broad benefits for patients and has been present in the health field for more than a century, its relevance is often underestimated. Instead, faster and shorter processes are preferred, which may limit professional development and result in malpractice. This situation led to the development of the present study, which aimed to evaluate the level of knowledge and perception of Clark’s technique among dental professionals and students in Ambato.

METHODS

An observational, descriptive, cross-sectional study was conducted at the Universidad Regional Autónoma de los Andes, Ambato campus, Ecuador, between June and September 2024. The population comprised 63 professionals and 90 students. The final sample included 50 participants (9 professionals and 41 students) selected via non-probabilistic convenience sampling who met the following criteria:

- Inclusion criteria: Dental professionals and students who voluntarily agreed to participate.
- Exclusion criteria: Non-dental individuals or those who did not complete the survey.

Procedures and techniques

Data collection was performed using a structured five-question survey administered digitally. The questionnaire assessed knowledge and perceptions of the Clark technique, its clinical use, perceived effectiveness, reported difficulties, and utility in other dental treatments. Instrument reliability was confirmed using Cronbach's alpha (0.91 for professionals, 0.87 for students).

Statistical analysis

Descriptive statistics were used to calculate response frequencies and percentages. Data were processed using SPSS version 25. No inferential tests were performed due to the study's exploratory nature. Incomplete responses were excluded.

Ethical considerations

The study was approved by the Institutional Ethics Committee of the Universidad Regional Autónoma de los Andes. All participants provided informed consent prior to survey completion. Data confidentiality was guaranteed, and the study adhered to the Declaration of Helsinki principles.

RESULTS

Table 1 shows strong knowledge and application of the Clark technique among dental professionals. 78 % reported familiarity with the technique, and 67 % had used it in clinical practice, considering it effective in most cases. Similarly, 67 % recognized its utility beyond endodontics, reflecting its versatility. Reported difficulties were minimal (22 %), suggesting professionals generally face no major obstacles in its application.

Table 1. Survey responses from dental professionals.

Question		No.	%
Are you familiar with the Clark technique?	Yes	7	78
	No	2	22
Have you used the Clark technique in endodontics?	Yes	6	67
	No	3	33
Has this technique been effective for you?	Yes	6	67
	No	3	33
Have you experienced difficulties using this technique?	Yes	2	22
	No	7	78
Has the Clark technique been helpful in other dental treatments?	Yes	6	67
	No	3	33

Table 2 reveals significant theoretical gaps among dental students regarding the Clark technique. Although 66 % knew of radiographic methods for proximal surfaces, only 32 % recognized its ability to identify accessory canals—indicating limited understanding of its full scope. However, willingness to use it in future practice was high (88 %), reflecting interest and motivation. Additionally, 51 % acknowledged its usefulness in molars with multiple canals, and more than half believed it should not be limited to endodontics.

Table 2. Survey responses from dental students.

Question		No.	%
Did you know there is a radiographic technique to view proximal surfaces?	Yes	27	65,9
	No	14	34,1
Did you know the Clark technique can identify accessory canals that would otherwise go undetected?	Yes	13	32
	No	28	68
Would you use this technique once you become a dental professional?	Yes	36	88
	No	5	12
Did you know this technique is very useful in teeth with multiple canals, such as molars?	Yes	21	51
	No	20	49
Do you think this technique should be used only in endodontics?	Yes	18	44
	No	23	56

DISCUSSION

Two surveys were analyzed: one targeting dental professionals and another focusing on students. Among professionals, responses to five questions revealed widespread familiarity with and use of the Clark technique in daily endodontic practice. This reflects strong acceptance and confidence in the method. Most respondents affirmed its effectiveness and reported no significant difficulties. Furthermore, they recognized its applicability beyond endodontics, underscoring its versatility and contributing to its clinical popularity.

These findings align with Ponce et al.,⁽⁹⁾ who note that the Clark technique is widely recognized in dentistry and requires specialized endodontic training. This ensures ethical, high-quality patient care and optimal outcomes. While alternative methods exist, the Clark technique remains essential due to its extensive validation and ability to reveal structures invisible to the naked eye.

A systematic review on the Clark technique concludes that radiography is just one component of dental treatment—especially in endodontics, where each case requires individualized analysis. The study also emphasizes the importance of updated equipment as a key factor in achieving optimal results. Thus, the widespread adoption of the Clark technique underscores its current relevance and efficacy, establishing it as an invaluable tool for clinicians.⁽¹⁰⁾

Among students, survey results show awareness of the Clark technique's existence but limited understanding of its diagnostic capabilities—particularly in identifying accessory canals. Nevertheless, students expressed strong willingness to incorporate it into future practice and recognized its value in complex cases like multi-canal molars. Most also believed it should extend beyond endodontics.

A case study by Martínez et al.,⁽¹¹⁾ on ameloblastic fibro-odontoma employed the Clark technique in surgical radiographic assessment. It proved highly beneficial in precisely locating an impacted tooth and defining the surgical approach, leading to an effective comprehensive treatment plan. This demonstrates the technique's significant advantages when applied with proper knowledge. In educational settings, students often discover such applications only through clinical practice, facilitating integration of theory and hands-on experience.

Following the same line of research, there is a study by Camarena et al.,⁽⁶⁾ on imaging diagnostic methods for maxillary canines. To determine the vestibular-lingual position, the Clark technique is used, which requires taking two periapical radiographs with different angulations. This technique involves varying the horizontal angulation of the cone in radiographic exposures of the same area. If the canine moves in the same direction as the cone, it is located in the palatal position; if it shifts in the opposite direction to the cone, it is in the vestibular position. If there is no variation, it is situated in an intermediate position between the roots of the neighboring teeth. This approach highlights the importance of the technique in this particular case.

CONCLUSIONS

This study addresses multiple perspectives on the Clark technique in endodontics—including its origins, historical background, key contributors, and fundamental characteristics—to underscore its importance in dental practice. As part of dental radiography, it is crucial for patient evaluation and treatment, providing clear X-ray images indispensable for accurate diagnosis. Both professional and student groups emphasized the technique's relevance and the need to understand both its practical application and theoretical foundations. Professionals demonstrated deep knowledge consistent with years of experience, while students—still in training—often viewed it merely as a radiographic method due to limited awareness of its broader applications. Therefore, integrating theory with practice—guided by the perspectives revealed in this study—is essential to ensure effective application and achieve optimal patient outcomes.

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