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Uso de UCLA dinâmico para reabilitação estética sobre implante em paciente com necessidades especiais: um relato de caso com 4 anos de acompanhamento

Dynamic UCLA for aesthetic rehabilitation on implant in a patient with special needs: A 4-year follow-up case report

Uso de UCLA dinámica para la rehabilitación estética de implante en paciente con necesidades especiales: reporte de un caso con 4 años de seguimiento

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Resumo

Este estudo tem como objetivo apresentar o UCLA dinâmico como opção protética para reabilitação de um implante mal posicionado, substituindo um incisivo lateral esquerdo superior ausente através de uma coroa estética e funcional. Os implantes dentários apresentam altas taxas de sucesso, no entanto, complicações relacionadas ao posicionamento tridimensional do implante são comuns. A correção da posição do implante geralmente requer o uso de pilares usinados angulados ou procedimentos cirúrgicos complexos, o que resulta em tratamento longo, difícil e aumenta o custo final. Paciente de 45 anos de idade, do gênero masculino, procurou atendimento odontológico especializado para restaurar um dente ausente em área estética. O paciente possui abertura bucal limitada, deficiências mentais e físicas; portanto, a construção de uma prótese metalocerâmica com o auxílio da UCLA dinâmica foi proposta como um procedimento direto e de baixo custo sob assinatura do termo de consentimento livre e esclarecido. O tratamento protético proporcionou resultados estéticos e satisfação do paciente com mínimas complicações após quatro anos de acompanhamento.

Palavras-chave: Implantes dentários; Prótese dentária fixada por implante; Deficiência intelectual; Seguimento.

Abstract

This study aims to present the dynamic UCLA as a prosthetic option to restore a tilted implant, replacing a missing maxillary left lateral incisor with a functional and aesthetic screw-retained crown. Dental implants show high success rates; however, complications related to three-dimensional positioning of the implant are common. The correction of the implant position usually requires machined angled abutments or complex surgical procedures, which results in long and difficult treatment, and increases the treatment final cost. A 45-years-old male patient sought for specialized dental care to restore the front missing tooth esthetic area. The patient has limited mouth opening, mental and physical disabilities, so the construction of a metal-ceramic prosthesis with the aid of dynamic UCLA was proposed as a straightforward and low-cost procedure under the sign of free and informed consent. The prosthetic treatment provided aesthetic results and patient satisfaction without complications after a four-year follow-up.

Keywords: Dental implants; Dental prosthesis implant-supported; Intellectual disability; Follow-up studies.

Resumen

Este estudio tiene como objetivo presentar el UCLA dinámico como una opción de rehabilitación de un implante mal posicionado, reemplazando un incisivo lateral superior izquierdo ausente por una corona estética y funcional. Los implantes dentales tienen altas tasas de éxito, sin embargo, las complicaciones relacionadas con el posicionamiento tridimensional del implante son comunes. La corrección de la posición del implante generalmente requiere el uso de pilares mecanizados en ángulo o procedimientos quirúrgicos complejos, lo que resulta en un tratamiento largo y difícil que aumenta el costo final. Un paciente masculino de 45 años buscó atención dental especializada para restaurar un diente faltante en el área estética. El paciente tiene una apertura bucal limitada, discapacidades mentales y físicas; por tanto, se propuso la construcción de una prótesis metalocerámica con la ayuda de un UCLA dinámico como un procedimiento directo y de bajo costo, todo fue realizado bajo la firma del consentimiento informado. El tratamiento protésico proporcionó resultados estéticos y satisfacción al paciente con mínimas complicaciones después de cuatro años de seguimiento.

Palabras clave: Implantes dentales; Prótesis dental fija sobre implantes; Discapacidad intelectual; Seguimiento.

1. Introduction

The use and acceptance of dental implants have improved and expanded treatment alternatives for fixed and removable dental prosthesis (Sripathi & Bhat, 2015). Currently, clinical success and outcomes of implants are well documented in the scientific literature. Alongside this successful story there are complications (Camargos et al., 2012) that challenge the prosthodontist to meet patient expectations (Chatterjee et al., 2015; Giannakopoulos et al., 2017). Commonly these complications are due to poor planning and poor communication between surgeon and prosthodontists, which might result in a common and avoidable complication: the three-dimensional implant positioning error (Chatterjee et al., 2015).

Severely misplaced implants may not allow a satisfactory restoration even with the use of alternative prosthetic abutments. Additionally, the relationship between the three-dimensional position of implants and restorations must be based on the implant neck and this relationship is important for a healthy self-response of hard and soft tissues (Buser et al., 2004). Some surgical procedures have been proposed with the main technical objective of repositioning a bone segment together with an osseointegrated implant (Silva et al., 2005).

In extremely compromised clinical cases, the conduct may be limited to submersion or surgical removal of the implant, however usually results in bone and soft tissue defects (Razak et al., 2019). On the other hand, a mild or moderate incorrect 3D position can be restored with pre-established abutment angles, which can become a limiting factor when they are unable to completely correct the 3D implant placement (Dubois et al., 2007). The dynamic Universal Castable Long Abutment (UCLA) allows the restoration of a tilted implant with a screw-retained implant prosthesis (Goiato et al., 2015). It corrects the implant position up to 20º, providing a favorable 3D relationship between the implant neck and the restoration emergence profile. However, there is a lack of clinical aspect and evidence about the dynamic UCLA long-term behavior.

Thus, the objective of this study is to report a 4-year follow-up case report that presents a prosthetic option to compensate for a tilted implant in the anterior maxilla.

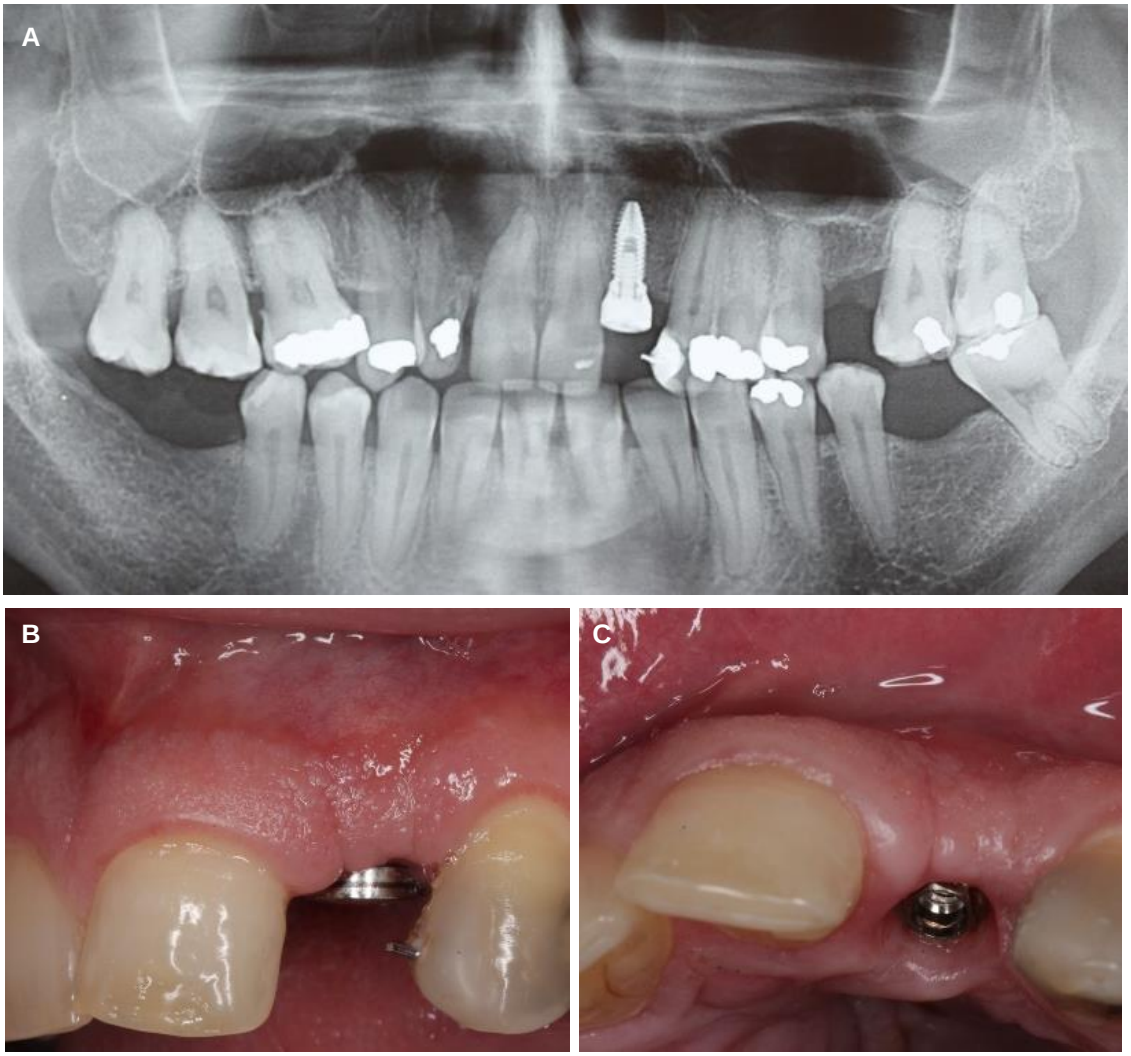
2. Methodology

Regarding the importance of clinical reports, this study qualitatively describes a 4-year follow-up case report assessing the clinical behavior of dynamic UCLA abutments in the esthetic area.

3. Case report

A 45-years-old male patient with intellectual and motor disabilities sought the dental prosthesis service of the State University of Maringa dental clinic requiring implant prosthesis in the maxillary left lateral incisor. The clinical examination revealed anterior open bite, limited oral opening (11 mm), an external hexagon implant in the region of upper lateral incisor already with the healing abutment, and the presence of remnants of the provisional that had come loose (Figure 1).

Figure 1. Initial exam. Panoramic radiograph (1a); Buccal (1b) and occlusal view of maxillary lateral incisor region (1c).



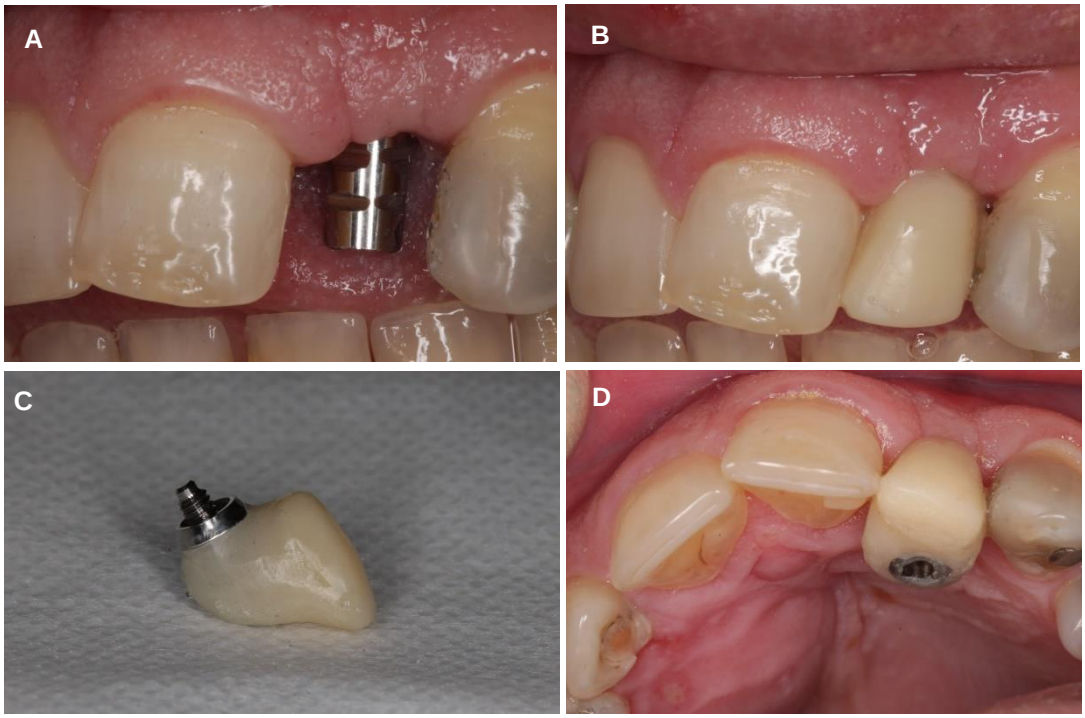
Source: The Authors

It was possible to see a good amount of keratinized mucosa, associated with a thick biotype where the gingival margin is 2 mm from the implant platform and a good level of bone crest. The implant presented a 4.1 mm external hexagon platform and was located in a more oral position than the ideal with an inclination towards the palate which, added to the limited mouth opening, made it difficult to access the implant with the screwdrivers. The patient's guardian reported that the patient has severe nausea and it was a limitation during the surgical implant procedure.

The patient and his guardian were informed about the impairments to optimal prosthetic result and the treatment options. The treatment established for the case was the manufacture of a provisional acrylic prosthesis by direct technique, with subsequent

rehabilitation with a metal-ceramic crown with the aid of 20º dynamic UCLA (Ucla Dinâmico, Mangran Internacional, Curitiba, Paraná, Brasil) to soften the palatal projection of final prosthesis. By the signature of a free and informed consent by the patient's guardian, the treatment was started. A provisional crown was made by direct technique with the use of pre-fabricated resin acrylic tooth and customization of a 4.1 mm standard anti-rotation titanium UCLA (UCLA Neodent, Straumann Group, Maringá, Paraná, Brasil). After the provisional crown placed, it was possible to observe a palatal projection (Figure 2) in the prosthesis due to poor inclination of the implant.

Figure 2. Provisional crown installation. Titanium UCLA installed, prior to the fabrication of a direct provisional crown (2a); Buccal aspect of the provisional crown (2b); Provisional restoration's emergence profile (2c); Occlusal view (2d).



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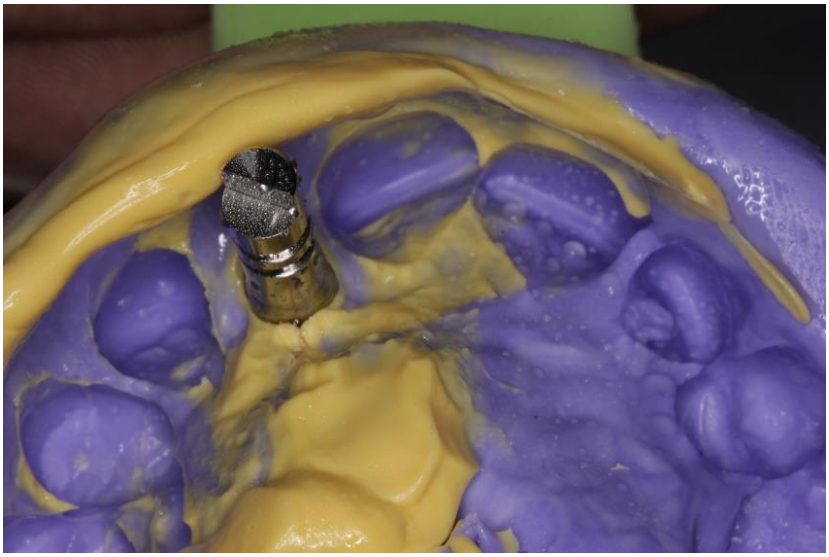
Accessing the screw during the procedures was difficult due to the limited mouth opening presented by the patient associated with the positioning of the implant. If no measures were taken to compensate for the inclination of the prosthesis, the patient would feel uncomfortable with the palatal volume.

Due to the nausea issues, a partial impression was performed. The impression was carried out with a transfer type impression coping technique (Chee & Jivraj, 2006) for single implants (Neodent) and polyvinyl siloxane (Futura AD, DFL, Taquara, Rio de Janeiro,

Brasil). Furthermore, the impression was taken and the transfer was connected to the analog and positioned inside the impression (Figure 3)

Figure 3. PVS impression with the implant's analogue in position. A partial impression technique was required due the insertion difficult of a standard tray. PVS = polyvinyl siloxane.



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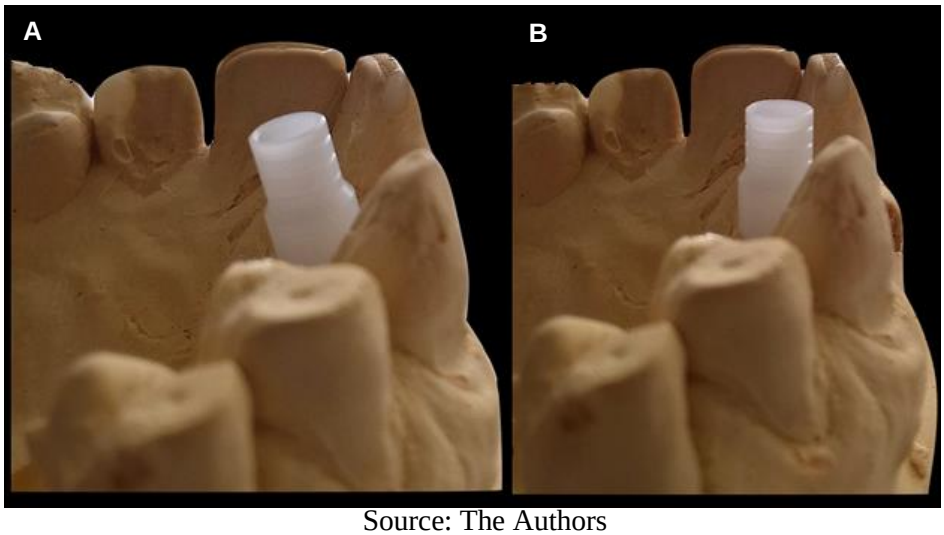
No impression was taken in the mandibular arch as the open bite prevented occlusal contact at the anterior area.

A removable silicone material (Gingifast; Zhermack, Badia Polesine, Italy) was placed around the implant analog to simulate the peri-implant soft tissue, and the type IV gypsum stone (Durone, Dentsply, São Paulo, São Paulo, Brasil) was subsequently poured. All manufacturer's recommendations were followed. Analyzing the plaster cast it was possible to observe the improvement in the palatal projection and screw access obtained with the dynamic UCLA (Figure 4). In this case, it was used a 4.1 mm diameter pre-adapted platform in chromium-cobalt alloy (Mangran Internacional).

Figure 4. Possible inclinations in a dynamic UCLA: 0º straight UCLA (4a); The 20º maximum angle (4b) that allows correction of the emergence profile and palatal contour. In addition, the dynamic UCLA abutment can rotate 360 degrees around its own axis.



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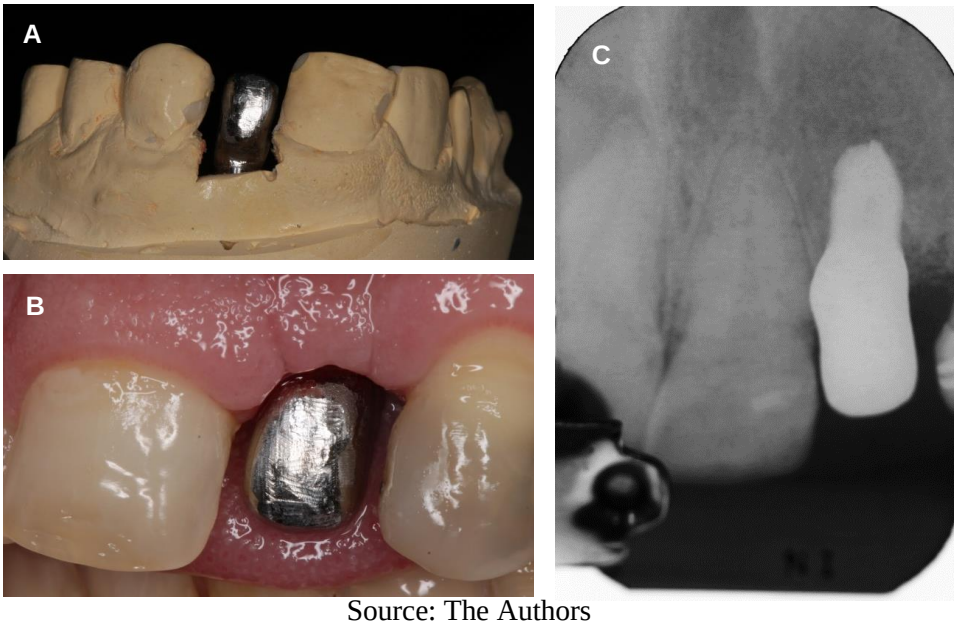
The cast was sent to the responsible dental technician, together with the dynamic UCLA and the specific screwdriver, for waxing and casting the metallic infrastructure. In order to create the best anatomy as possible for the palatal concavity, a metallic palatal surface was designed. The metallic infrastructure was clinically and radiographically evaluated (Figure 5).

Figure 5. Metal structure over cast model (5a). Clinical fit evaluation (5b) and Radiographic evaluation (5c)



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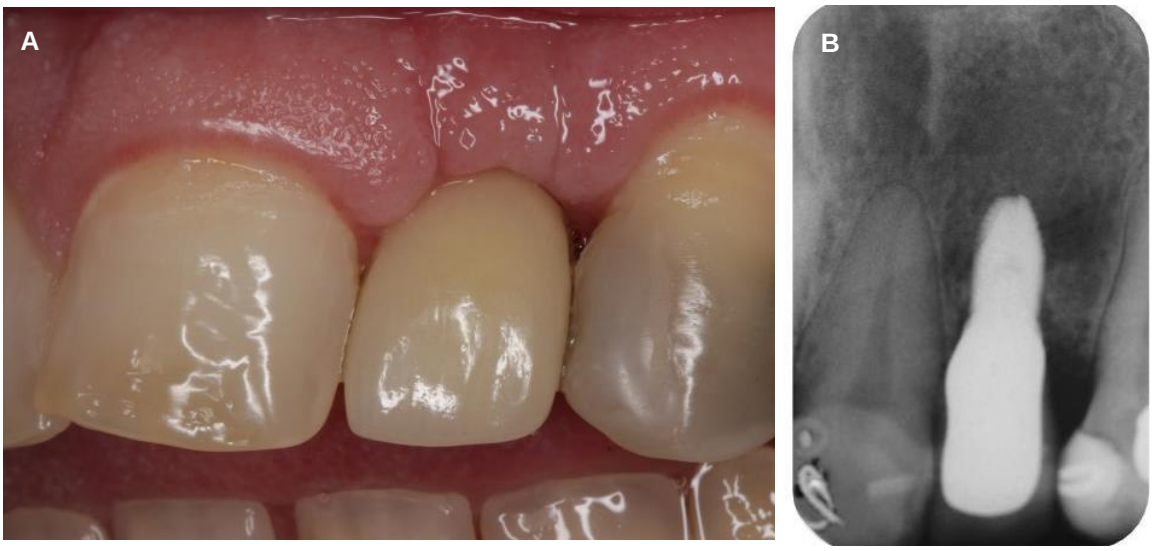
Due to nausea, it was necessary to use a children's periapical film for radiographic taking (Insight, Carestream, Rochester, New York, USA). Finally, the color (B4) and photographs collection were recorded for the porcelain application by the technician.

Furthermore, it was obtained a metal-ceramic crown with an appropriate emergence profile and dimensions close to ideal. At the installation, the proximal contacts were checked, a periapical radiographic was taken (Figure 6) and a 30 N torque was applied to the UCLA screw, according to manufacturer's specifications. Although the patient's disabilities, esthetic aspects such as color and shape were evaluated by the patient, his guardian and responsible professional.

Figure 6. Metal ceramic single crown, installed after clinical evaluation. Buccal aspect (6a). It is possible to see a good amount of soft tissue around the fixed dental crown; Radiographic evaluation (6b).



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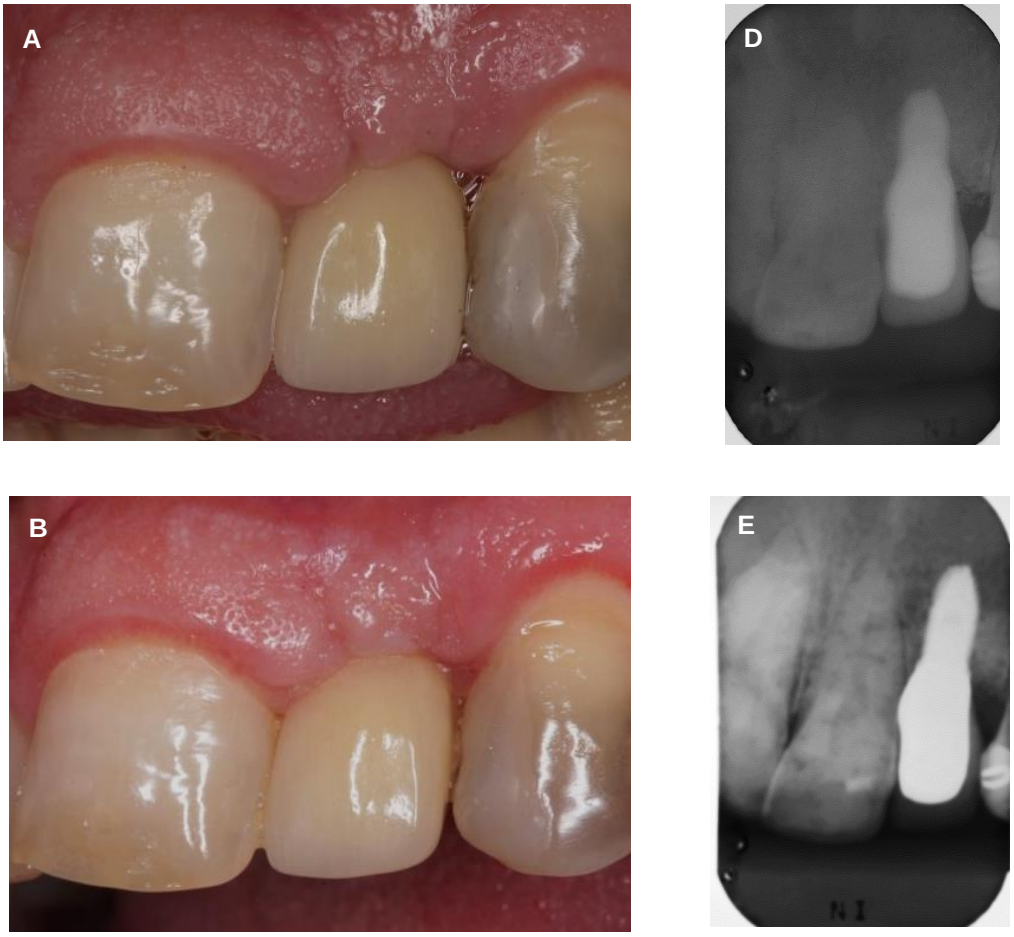
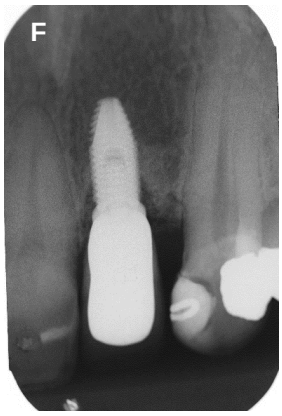
The screw hole was provisionally sealed with a teflon tape (Isotape, TDV, Pomerode, Santa Catarina, Brasil) and a temporary resin composite (Bioplic, Biodinâmica, Ibiporã, Paraná, Brasil). The conditioning of the gingival tissue around the crown was below expectations, however, as the clinical aspects were favorable to tissue accommodation, we decided to install the prosthesis and follow up. The patient and his guardian were instructed on how to properly clean the implant area with toothbrush and dental floss.

On the return appointment, 15 days after the crown installation, peri-implant health and absence of plaque were noticed, concluding the conditions were favorable for accommodation of the gingival tissue around the restoration. The 30 N torque was checked

and the screw hole was sealed with a Teflon Tape (TDV) and a resin composite (Charisma Classic, São Paulo, São Paulo, Brasil). The patient was enrolled in a follow-up protocol, consisting of an appointment after the first six months and, subsequently, annual visits. After each follow-up visit, the patient received custom hygiene instruction. At the two-year follow-up, peri-implant health aspect was noted, as well as a good accommodation of the tissues adjacent to the metal-ceramic crown. No mechanical complications were observed. At the four-year follow-up was performed and no mechanical complications, such a screw-loosening, chipping or ceramic fracture were observed. However, a small black space is present due to a slight distal crestal bone tissue loss (Figure 7).

Figure 7. Clinical aspect after 15 days (7a), 2 years (7b) and 4 years (7c) of follow up. There was an adaptation of gingival tissue, however there was not formation of distal papilla. Periapical radiographs after 15 days (7d), 2 years (7e) and 4 years (7f) of follow up.





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4. Discussion

Poorly positioned implants are a preventable problem. Meticulous planning with diagnostic waxing, surgical guide, diagnostic imaging and good communication between surgeons, prosthodontists and the laboratory could prevent this problem (Chatterjee et al., 2015; Giannakopoulos et al., 2017). In this case report, the cognitive and motor disabilities of the patient, and local surgical limitations influenced the implant installation, however, complementary surgical procedures or long treatments were not indicated. Thus, a simple, fast and economical alternative was proposed to compensate the implant position.

The rehabilitation of poorly positioned implants can be performed with screwed or cemented prosthesis. Studies indicate that screwed prostheses have a higher incidence of technical complications, such as screw loosening and fracture / chipping of the ceramic, while cemented prosthesis present more biological complications, although the failure rates for both types of retention are not statistically different (Wittneben et al., 2014; Millen et al., 2015).

In the present case report, the patient present motor disabilities, that could difficult cleaning the area, in this way, a screw-retained restoration was proposed considering the easy access for eventual professional cleaning, evaluation or repair. If a cemented prosthesis was chosen, the excess of could act as a plaque retention factor (Shadid & Sadaga, 2012). Although there is no sufficient evidence to show the difference in the behavior of soft and hard tissue around screwed or cemented implants for the rehabilitation of single tooth loss (Vigolo et al., 2012), but, the peri-implant soft tissue seems to respond better to screwed prostheses compared to cemented prostheses (Weber et al., 2006). Considering the cement

interference in plaque retention and irreversibility factor after crown cementation, screw-retained prosthesis has been recommended in a systematic review (Wittneben et al., 2014).

Some angled abutments have been also recommended to correct a misplaced implant and improve the prosthetic treatment (Cavallaro & Greentein, 2011). However, when implants are placed shallower than ideal position, the restoration can be esthetically affected by angled abutments (Bordin et al., 2019) and the UCLA abutment can be a viable option (Goiato et al., 2015).

The previous opted dynamic UCLA with a pre-adapted interface was established because the use of UCLA as calcinable abutments interfaces can result in a microleakage restoration due to the sensitive technique casting process (Nascimento et al., 2008). External hexagon type connections have an unfavorable design and stress distribution when compared to the Morse type internal connection implants (Pessoa et al., 2017), what implies in increased risk of prosthetic complications (Camargos et al., 2012). A retrospective cohort study was carried out on patients who received dental implants between 1997 and 2007. It was analyzed 73 implants and found that 21% of the prostheses had loosening of the prosthetic screw and of these, 92.9% occurred in a UCLA abutment (Camargos et al., 2012). In the presented case report, screw loosening or other technical complications were not reported during four years of follow-up. Possibly, patient's open bite contributed to preventing lateral forces that could contribute to screw loosening. Regardless the limitations of the study, the combination of dynamic UCLA and metal palatal face resulted in an aesthetic rehabilitation, without excessive palatal projection, which is easy to clean up and maintain.

5. Final Considerations

In the present clinical report, the dynamic UCLA was proposed as a simple and low-cost alternative for a tilted implant in aesthetic zone, in a patient with intellectual and motor disabilities. The prosthetic treatment provided aesthetic results and patient satisfaction with minimum complications after four years of follow-up.

Additionally, dynamic UCLA is a viable option to construct a screw-retained crown when the ideal implant position is not observed.

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References

Bordin, D., Cury, A. A. D. B., & Faot, F. (2019). Influence of Abutment Collar Height and Implant Length on Stress Distribution in Single Crowns. *Braz Dent J*, 30(3), 238-243.

Buser, D., Martin, W., & Belser, U. C. (2004). Optimizing esthetics for implant restorations in the anterior maxilla: anatomic and surgical considerations. *Int J Oral Maxillofac Implants*, 19suppl, 43-61.

Camargos, G. V., Prado, C. J., Neves, F. D., & Sartori, I. A. (2012). Clinical outcomes of Single Dental Implants with external connections: results after 2 to 13 years. *Int J Oral Maxillofac Implants*, 27(4), 935-944.

Cavallaro, J., & Greenstein, G. (2011). Angled implant abutments: a practical application of available knowledge. *J Am Dent Assoc*, 2, 150-158.

Chatterjee, A., Ragher, M., Patil, S., Chatterjee, D., Dandekeri, S., & Prabhu, V. (2015). Prosthetic management of malpositioned implant using custom cast abutment. *J Pharm Bioallied Sci*, 7(Suppl 2), S740–S745.

Chee, W., & Jivraj, S. (2006). Impression techniques for implant dentistry. *Br Dent J*, 201(7),429-432.

Dubois, G., Daas, M., Bonnet, A. S., & Lipinski, P. (2007). Biomechanical study of a prosthetic solution based on an angled abutment: case of upper lateral incisor. *Med Eng Phys*, 29(9),989-998.

Giannakopoulos, N. N., Ariaans, K., Eberhard, L., Klotz, A. L., Oh, K., & Kappel, S. (2017).

Immediate and delayed loading of two-piece reduced-diameter implants with locator-analog attachments in edentulous mandibles: One-year results from a randomized clinical trial examining clinical outcome and patient expectation. *Clin Implant Dent Relat Res*, 19(4),643-653.

Goiato, M. C., Sônego, M. V., da Silva, E. V., Dekon, S. F. C., Medeiros, R. A., Carvalho, K. H. T., & Santos, D. M. (2015). Dynamic UCLA for single tilted implant in an aesthetic region. *Int J Surg Case Rep*, 7C,149-153.

Millen, C., Brägger, U., & Wittneben, J. G. (2015). Influence of prosthesis type and retention mechanism on complications with fixed implant-supported prostheses: a systematic review applying multivariate analyses. *Int J Oral Maxillofac Implants*, 30(1),110-124.

Nascimento, C., Barbosa, R. E., Issa, J. P., Watanabe, E., Ito, I. Y., & Albuquerque, R. F. Jr. (2008). Bacterial leakage along the implant-abutment interface of premachined or cast components. *Int J Oral Maxillofac Surg*, 37(2),177-180.

Pessoa, R. S., Sousa, R. M., Pereira, L. M., Neves, F. D., Bezerra, F. J., Jaecques S. V. N., Sloten, J. S., Quirynen, M., Teughels, W., & Spin-Neto, R. (2017). Bone Remodeling Around Implants with External Hexagon and Morse-Taper Connections: A Randomized, Controlled, Split-Mouth, Clinical Trial. *Clin Implant Dent Relat Res*, 19(1),97-110.

Razak, P. A., Aravind, P., Purushotham, P., Ravi, R., Kunnaiah, R., & Parambath, S. R. (2019). Management of a malposed dental implant in the esthetic zone. *J Indian Soc Periodontol*, 24(1),83–86.

Shadid, R., & Sadaqa, N. (2012). A comparison between screw-and cement-retained implant prostheses. A literature reviews. *J Oral Implantol*, 38(3),298-307.

Silva, L. C. F., Vasconcelos, B. C. E., Vasconcellos, R. J. H., & Anjos, E. D. (2005). Reposição cirúrgico-ortopédica de implante mal posicionado: relato de caso. *R Dental Press Ortodon Ortop Facial*, 10(3),118-124.

Sripathi, Rao B. H., & Bhat, S. V. (2015). Dental implants: a boon to dentistry. *Arch Med*

Health Sci, 3(1),131-137**.**

Vigolo, P., Mutinelli, S., Givani, A., & Stellini, E. (2012). Cemented versus screw-retained implant-supported single-tooth crowns: a 10-year randomised controlled trial. *Eur J Oral Implantol*, 5(4),355-364.

Weber, H. P., Kim, D. M., Ng, M. W., Hwang, J. W., & Fiorellini, J. P. (2006). Peri-implant soft-tissue health surrounding cement- and screw-retained implant restorations: a multi-center, 3-year prospective study. *Clin Oral Implants Res*,17(4),375-379.

Wittneben, J. G., Buser, D., Salvi, G. E., Bürgin, W., Hicklin, S., & Brägger, U. (2014). Complication and failure rates with implant-supported fixed dental prostheses and single crowns: a 10-year retrospective study. *Clin Implant Dent Relat Res*,16(3),356-364.

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