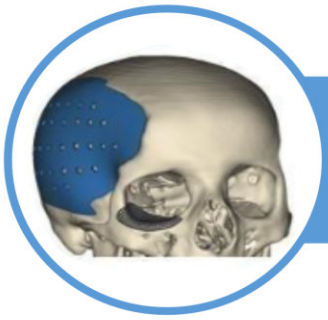

BRAZILIAN JOURNAL OF IMPLANTOLOGY AND HEALTH SCIENCES

ISSN 2674-8169

SURGICAL PLACEMENT OF A NARROW IMPLANT (NARROW GM HELIX NEODENT®): A CASE REPORT

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https://doi.org/10.36557/2674-8169.2025v7n7p91-105
Artigo recebido em 22 de Maio e publicado em 02 de Julho de 2025

CASE REPORT

ABSTRACT

Introduction: Narrow-diameter implants have been increasingly used in dentistry in recent years. Initially developed for placement in reduced interproximal spaces, their clinical indication has expanded with the goal of avoiding more invasive surgical procedures, such as bone grafts for alveolar ridge augmentation, thereby reducing treatment morbidity. Objective: The objective of this study was to report the use of narrow implants as a viable alternative for the rehabilitation of reduced prosthetic spaces, especially in clinical situations involving small cervical tooth diameters, decreased interradicular distance, thin alveolar ridge, or failure in bone augmentation procedures. Conclusion: It is concluded, through the present case report, that narrow osseointegrated implants represent an effective and safe alternative for the rehabilitation of partially edentulous patients. They are indicated for both anterior single-unit and removable partial prostheses, as well as elective cases in posterior regions.

Keywords: Narrow Implant. Osseointegration. Dental Implant.

CIRURGIA DE INSTALAÇÃO DE IMPLANTE ESTREITO (NARROW GM HELIX NEODENT®) RELATO DE CASO

RESUMO

Introdução:Os implantes de diâmetro reduzido estão sendo utilizados na odontologia com maior frequência nos últimos anos. Inicialmente desenvolvidos para instalação em regiões interproximais reduzidas, sua indicação clínica foi ampliada com o objetivo de evitar procedimentos cirúrgicos mais invasivos, como enxertos ósseos para aumento do rebordo alveolar, reduzindo a morbidade do tratamento. Objetivo: O objetivo deste trabalho foi relatar a utilização de implantes estreitos como alternativa viável para reabilitação de espaços protéticos reduzidos, especialmente em situações clínicas com diâmetro cervical dental pequeno, distância interradicular diminuída, crista óssea delgada ou insucesso em procedimentos de aumento ósseo. Conclusão: Conclui-se, por meio do presente relato de caso, que os implantes osseointegráveis estreitos representam uma alternativa eficaz e segura na reabilitação de pacientes parcialmente edêntulos, sendo indicados tanto para próteses unitárias quanto parciais removíveis anteriores, além de casos eletivos em regiões posteriores.

Palavras-chave: Implante Estreito. Osseointegração. Implante Dentário.

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INTRODUCTION

With the increase in life expectancy of the population, there is a growing number of patients in need of oral rehabilitation. Through the use of dental implants, treatments can be performed to rehabilitate edentulous patients, offering a predictable solution for most cases observed in clinical dental practice (Morashini et al., 2015). Implant dentistry has evolved over time, and today it is not only necessary to restore the patient's masticatory and phonetic function, but also to meet aesthetic expectations and the demand for less invasive and more successful treatments (Morashini et al., 2015). The resorption of the alveolar ridge after tooth loss is a physiological process that begins immediately after extractions and causes a 40–60% reduction in the horizontal and vertical dimensions of the remaining ridge during the first year (Schropp et al., 2003). In an attempt to minimize bone loss, several preservation techniques have been developed to reduce bone resorption using different types of bone graft materials, either alone or in combination with membranes or physical barriers (Horowitz et al., 2012). However, bone availability remains a limiting factor during implant planning. Bone reconstruction surgeries are often rejected by patients seeking less invasive and simpler procedures (Papasyridakos et al., 2012; Pommer et al., 2016). To reduce the need for extensive and complex bone grafting surgeries, or to rehabilitate prosthetic spaces with reduced width, narrow implants were developed and introduced into modern implant dentistry (Posch et al., 2017).

A universally accepted classification of implant diameters has been established, according to which narrow implants have a diameter ≥ 2.0 mm and ≤ 3.5 mm. The protocols developed for surgical treatment and prosthetic placement of regular diameter implants (≥ 3.5 mm) can be applied to narrow implants as well (Degidi et al., 2008). Narrow implants are indicated for clinical situations such as the replacement of teeth with small cervical diameters, reduced interradicular bone distance, narrow alveolar ridges, and in areas where alveolar ridge dimensions are restricted and there is insufficient space for conventional implants (such as in mandibular central incisors, maxillary lateral incisors, and maxillary premolars) (Davarpanah et al., 2000; Posch et al.,

2017). They are also used in cases where bone augmentation procedures have failed. Narrow implants have been increasingly used in the rehabilitation of patients with limited bone width and thickness (Coelho et al., 2014; Posch et al., 2017). Therefore, narrow diameter implants are more suitable for these clinical situations. The replacement of teeth with small clinical crowns may require the use of reduced platforms to provide an appropriate emergence profile (Barter et al., 2012). To meet market demands, the industry has developed implants with different materials, macrogeometries, and surface treatments with the goal of rehabilitating the greatest number of patients in a variety of clinical situations, even in cases with severe bone volume restrictions (Coelho et al., 2014). The use of narrow implants in the rehabilitation of the anterior maxilla and their success have been widely reported in the literature (Javed et al., 2013; Klein et al., 2014). However, clinical studies describing the use of narrow implants in the posterior maxilla and mandible remain scarce (Assaf et al., 2015; Coelho et al., 2014).

In view of de above, the aim of the present work is to describe and present, through a clinical case report, the use of narrow implants by the manufacturer Neodent specifically the Narrow implant in the upper premolar region.

CASE REPORT

A 38 year old male patient, J.J.S., presented for triage at the Specialization Clinic in Implant Dentistry at the Recife School of Dentistry (Faculdade de Odontologia do Recife – FOR), in Recife, PE, seeking evaluation for the rehabilitation of edentulous areas and implant placement in the region of teeth 14 and 15.

Initially, anamnesis was conducted to gather information about the patient's oral and systemic health. His medical history showed no significant findings. The patient reported discomfort due to the missing teeth and expressed a desire to replace the lost dental elements, as he experienced difficulty chewing and felt that his self-esteem was affected.

During the clinical examination of the oral cavity, the interocclusal relationship was

assessed and found to be favorable, with the patient presenting a Class II bite. Mouth opening was also evaluated and found to be adequate, allowing sufficient vertical space for drilling and implant insertion. Although there was favorable interocclusal height in the region, the interdental space was insufficient, presenting as a reduced area for the possible placement of regular implants. Laboratory tests were requested, including complete blood count, coagulation profile, and fasting blood glucose, as well as a cone beam computed tomography (CBCT) scan of the maxilla to evaluate bone conditions and plan the surgery.

Upon returning with the results at the next appointment, the laboratory tests showed all values within the normal range for proceeding with surgery. The CBCT scan revealed sufficient bone height for implant installation: 12.3 mm in the region of tooth 14 and 9.5 mm in tooth 15. However, it was also observed that the patient had only 12 mm of interdental space between teeth 13 and 16, which does not meet the minimum interdental requirement of 7 mm per implant site. Ideally, in this clinical scenario, the required space would be at least 14 mm, but the patient had only 12 mm available.

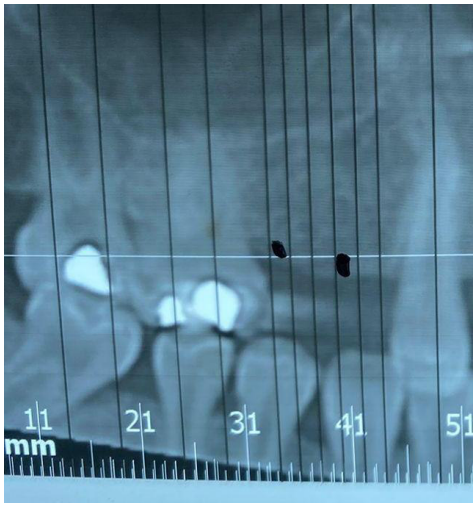


Figure 1: Computed tomography scan of the studied region.

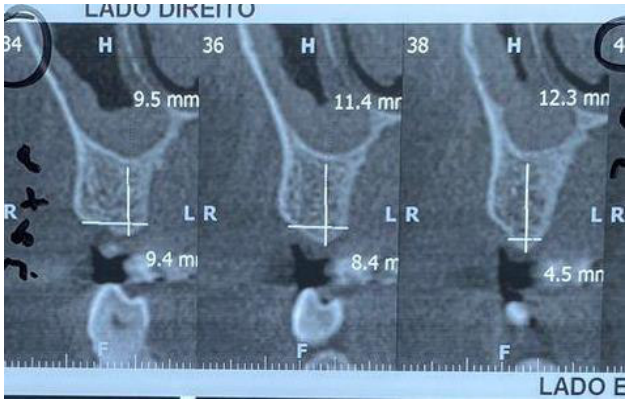


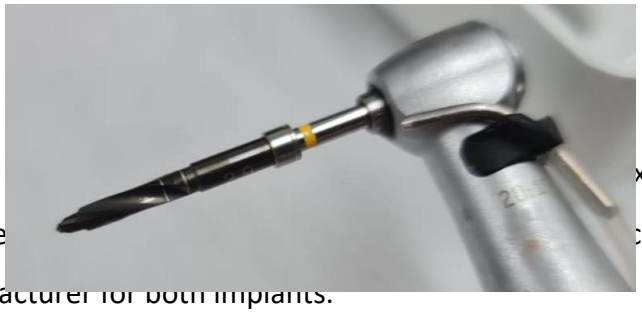
Figure 2: Computed tomography in axial sections.

Given the bone conditions and in order to meet the minimum biological requirements respecting the distances described in the literature of 3 mm between implants and 1.5 mm between teeth it was decided to plan the surgical installation of two narrow implants, Narrow GM Helix (Neodent), with a diameter of 2.9 mm and a length of 10 mm. A conventional surgical approach was selected for the procedure. On the day of surgery, after performing an infiltrative anesthetic technique and a block of the superior alveolar nerve along with complementary palatal anesthesia, 2% mepivacaine hydrochloride with epinephrine 1:200,000 (Mepiadre, DFL, Rio de Janeiro, RJ, Brazil) was administered. An incision was made, and a full-thickness flap was elevated, exposing the gingival tissue and periosteum to reveal the bone for drilling.

For the initial drilling, a lance drill from Neodent Narrow GM Helix (Curitiba, Paraná, Brazil) was used at 800 rpm to mark the initial positions where the two implants would be inserted. Following the initial perforation, the drilling sequence recommended by the manufacturer was followed. A 2.0 mm Neodent Narrow drill (Curitiba, Paraná, Brazil) was used at 800 rpm. Parallelism between the drillings was confirmed using paralleling pins.

Figure 3: 2.0 mm Drill – Narrow GM Helix Neodent.

After verifying the parallelism between the implants, drilling was continued using the final 2.9 x 10 mm drill at 800 rpm for subsequent implant placement.



x Neodent drill.

The ce and rotation indicated by the manufacturer for both implants.

F drill sequence.

After the final drilling, both Narrow GM Helix implants measuring 2.9mm x 10mm were picked up using the implant driver for Neodent Narrow GM Helix contra-angles (Curitiba, Paraná, Brazil) and the implants were inserted at 12 rpm with an initial locking torque of 40 N.cm.

iver of the Narrow GM Helix Neodent implant.

Next, the implants were installed in the recipient site, both inserted 1 mm below the alveolar bone crest. The covers (healing caps) were placed using the Narrow GM Neodent prosthetic driver, also specific to the chosen brand, and finally, the flap was sutured with 3-0 silk thread.

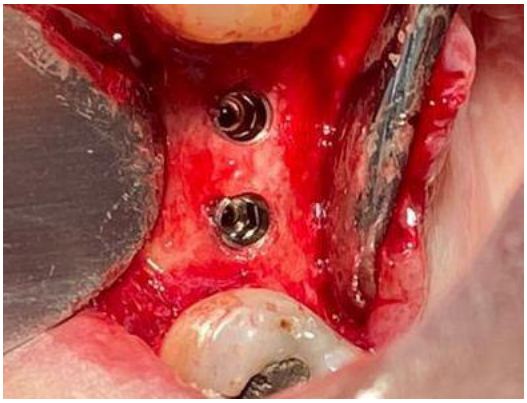


Figure 7: Narrow GM Helix Neodent implants 2.9x10mm in the recipient site.

Figure 8: Narrow GM Helix Neodent cover.

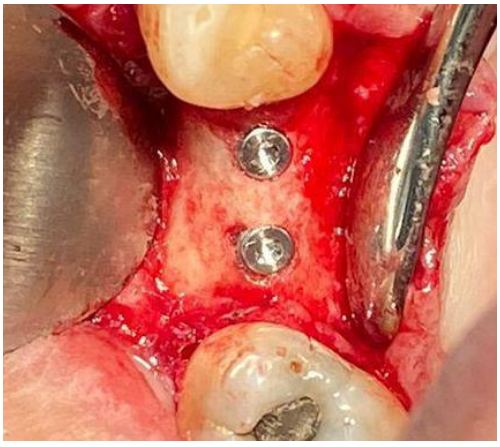


Figure 9: Narrow GM Helix Neodent cover

At the end of the surgery, the following medications were prescribed: Amoxicillin 875 mg every 12 hours for 7 days, Ketoprofen 100 mg every 12 hours for 5 days, Dipyrone 1 g every 6 hours for 72 hours or as needed for pain, and a 0.12% chlorhexidine mouth rinse every 12 hours for 7 days (however, the mouth rinse should only be started 24 hours after the surgery to avoid stimulating clot formation and bleeding in the operated area). Postoperative and hygiene instructions were also provided.

Eight days after surgery, the sutures were removed and the surgical site was examined. Healing was within the normal range, and the patient was advised to return for implant reopening and the beginning of the prosthetic phase three months after the surgery.

DISCUSSION

Reduced diameter implants may be a viable option for oral rehabilitation in patients with limited bone availability for the placement of regular diameter implants, avoiding surgical techniques for alveolar ridge augmentation that would increase the morbidity of the treatment (Anitua et al., 2010).

The use of reduced diameter implants has been studied in cases where the interproximal space is insufficient for regular-diameter implants, or in regions with limited bone volume or both. There are concerns regarding the mechanical resistance of reduced-diameter implants, including the strength of their prosthetic components (Allum et al., 2006; Hirata et al., 2014).

In vitro studies have been and are still being carried out to evaluate the performance of narrow implants. The results indicate that compressive stresses are higher in reduced-diameter implants, and that standard-diameter implants show greater fracture resistance in the implant/component assembly (Allum et al., 2006; Hirata et al., 2014). However, some clinical studies show satisfactory outcomes with narrow implants when followed up over periods longer than five years (Anitua et al., 2010; Yaltirik et al., 2011). One clinical study reported that reduced-diameter implants used for single tooth replacement in the anterior maxilla had similar outcomes to standard diameter implants

placed in the same region (Andersen et al., 2001). Regarding the functional and esthetic performance of narrow implants, several scientific studies have reported favorable results (Sohn et al., 2011; Galindo-Moreno et al., 2012).

The predecessor of the Narrow implant, the Facility implant (Neodent®, Curitiba, Brazil) with a diameter of 2.9 mm, just like the Narrow implant, is indicated for the replacement of upper lateral incisors and lower incisors. It is suitable for all bone densities and can be used in single or multiple-unit prostheses, immediate or conventional loading protocols. The drilling speed should be adjusted to 800–1200 rpm for type I and II bone, and 500–800 rpm for type III and IV bone, with a maximum torque of 45 N.cm. Its use for replacing posterior teeth, with or without standard-diameter implants, is considered off-label that is, not officially indicated. However, current scientific evidence supports satisfactory clinical results for the use of narrow implants in posterior regions (Anitua et al., 2010; Yaltirik et al., 2011; Gonczarowska, 2021).

A systematic review conducted in 2014 found a survival rate between 90.9% and 100% for implants with diameters between 1.8 mm and 2.5 mm, and between 93.8% and 100% for implants measuring 3 mm to 3.25 mm in diameter. However, the study concluded that while 3.0 mm and 3.25 mm implants are well documented, they are recommended only for single tooth replacements in low load areas. Implants smaller than 3.0 mm are indicated solely for the replacement of upper single teeth, and long-term studies on them are still lacking (Klein et al., 2014).

Currently, clinical case reports describe the use of narrow-diameter implants for tooth replacement in the anterior mandible and for single tooth replacement in the posterior mandible. However, these are isolated cases with short follow-up periods (Mohamed et al., 2012). Surgical planning is a key factor for successful prosthetic rehabilitation. Choi et al. (2017) demonstrated that proper implant positioning and angulation are essential for achieving acceptable prosthetic results. Incorrect angulation or implant placement can lead to complications, such as compromised prostheses and the transmission of unfavorable occlusal forces to the implants, or esthetic issues with the prosthesis.

In some situations, narrow diameter implants are not just an option they are the only option. This is especially true for lower incisors and upper lateral incisors, which are the

smallest teeth mesiodistally. The use of regular implants in these areas is often challenged by limited space between adjacent teeth. In such cases, it is essential to follow the guideline of maintaining a 1.5 mm space between an implant and a tooth, and 3.0 mm between two implants (González-Valls et al., 2021). In this case report study, the positioning of the implants allows for two prosthetic rehabilitation options: a screw retained prosthesis or a cement retained prosthesis. At present, the literature contains only a few clinical case reports describing the use of reduced-diameter implants for tooth replacement in the anterior mandible and even fewer in the posterior regions. These remain isolated cases with limited follow-up, which do not yet fully support the broader indication of narrow implants for posterior mandibular and maxillary regions (Mohamed et al., 2012; González-Valls et al., 2021).

FINAL CONSIDERATIONS

Narrow implants can be used in areas with reduced interdental prosthetic space and in individuals with insufficient alveolar ridge width. In the surgical case described, the use of Narrow GM Neodent implants demonstrated that the surgical technique is not complex to perform. The procedure proved to be simple to execute, provided that the clinician has knowledge of the biological principles and is proficient in the surgical drilling sequence required for implant placement. The Narrow GM Neodent implant can be a viable treatment alternative, aiming to avoid bone augmentation or grafting surgeries, resulting in reduced treatment time, lower morbidity, and lower cost.

In the clinical case reported, the biological space requirements between teeth and narrow implants were respected. So far, the implants are in favorable condition for the fabrication of the prostheses. Although the use of reduced-diameter implants is a viable alternative for the treatment of patients with insufficient bone availability for regular-diameter implants, further studies are needed to confirm their success in posterior regions with higher masticatory loads. The success of the treatment lies in proper planning, meticulous execution of the technique, and the adoption of scientifically based protocols. More studies on the use of narrow implants and long-term follow-up are necessary to confirm and establish new conclusions.

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