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DENTAL IMPLANTS TO RESTORE PATIENT'S QUALITY OF LIFE

(IMPLAN GIGI UNTUK MENGEMBALIKAN KUALITAS HIDUP PASIEN)

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ABSTRACT

Tooth loss can lead to physical and psychological problems such as impaired chewing, digestive disorders, changes in facial structure, speech difficulties, and reduced self-confidence, which may trigger anxiety and depression. The 2023 Indonesian Health Survey reported that although 31.9% of people had experienced tooth extraction, only 3.1% had their teeth replaced, showing a significant treatment gap. Dental implants have emerged as the gold standard for tooth replacement due to their superior function, stability, and aesthetic outcome compared to conventional dentures. This case report discusses a 63-year-old female patient who presented with chewing difficulties and esthetic concerns due to the loss of mandibular teeth numbers 45 and 46. Clinical and radiographic examinations revealed adequate alveolar bone volume, a healthy periodontal condition, and no systemic contraindications despite a history of anti-cancer drug use more than 15 years prior. Two implants, with a diameter of 4.6 mm and a length of 10.5 mm, were placed in the mandibular premolar and molar regions, followed by the placement of healing abutments and porcelain-fused-to-metal crowns after osseointegration. Postoperative evaluations revealed

excellent implant stability, improved masticatory function, and high aesthetic satisfaction, with a significant positive psychological impact. This case demonstrates the effectiveness of dental implants as a reliable rehabilitation option that enhances oral health and improves quality of life.
had them replacedprovide a functional, stable, and aesthetically pleasing
Keywords: dental implant; quality of life

ABSTRAK

Kehilangan gigi dapat menyebabkan masalah fisik dan psikologis, seperti gangguan mengunyah, gangguan pencernaan, perubahan struktur wajah, kesulitan berbicara, dan penurunan rasa percaya diri, yang dapat memicu kecemasan dan depresi. Survei Kesehatan Indonesia 2023 melaporkan bahwa meskipun 31,9% orang telah mengalami pencabutan gigi, hanya 3,1% yang menjalani penggantian gigi. Hal ini menunjukkan kesenjangan perawatan yang signifikan. Implan gigi telah menjadi standar emas penggantian gigi karena fungsi, stabilitas, dan hasil estetikanya lebih unggul dibandingkan gigi palsu konvensional. Laporan kasus ini membahas seorang pasien wanita berusia 63 tahun yang datang dengan kesulitan mengunyah dan masalah estetika akibat kehilangan gigi 45 dan 46. Pemeriksaan klinis dan radiografi menunjukkan volume tulang alveolar yang memadai, kondisi periodontal yang sehat, dan tidak ada kontra indikasi sistemik meskipun memiliki riwayat penggunaan obat antikanker lebih dari 15 tahun sebelumnya. Dua implan berdiameter 4,6 mm dan panjang 10,5 mm dipasang pada regio premolar dan molar mandibula, diikuti dengan pemasangan healing abutment dan mahkota porselen yang menyatu dengan logam setelah osseointegrasi. Evaluasi pascaoperasi menunjukkan stabilitas implan sangat baik, fungsi mastikasi lebih baik, dan kepuasan estetika yang tinggi, dengan dampak psikologis positif yang signifikan. Kasus ini mendukung efektivitas implan gigi sebagai pilihan rehabilitasi yang andal yang meningkatkan kesehatan mulut dan kualitas hidup.

***Kata kunci** : gigi tiruan implant, kualitas hidup*

INTRODUCTION

Losing one or more teeth can trigger significant physical and emotional distress, directly lowering a patient's quality of life.[1] Physically, patients often face limitations in chewing food, which can lead to nutritional and digestive problems. Not only that, but the structure of the face can also change, making the appearance look older and interfering with the clarity of speech. Deeper, tooth loss also triggers significant emotional impacts. Shyness, decreased self-confidence, and even anxiety and depression can appear, inhibiting social and professional interactions. This condition causes a person to withdraw and reduce their participation in daily activities, thereby directly limiting their life experience. Overcoming tooth loss is not only about restoring function, but also about restoring the patient's dignity and psychosocial well-being.

The results of the 2023 Indonesian Health Survey (SKI), published by the Indonesian Ministry of Health, show that 31.9% of Indonesians have undergone tooth extraction, but only 3.1% have dentures installed.[2] It indicates a significant gap in the management of tooth loss in Indonesia. The 2023 SKI data serves as a critical alarm for the government and dental health practitioners to improve education, access, and availability of dental replacement services in Indonesia, thereby enhancing people's quality of life. Teeth that are extracted should be replaced with dentures. Denture treatment effectively improves jaw connections in cases with numerous missing teeth and loss of occlusal support, resulting in a stable occlusion and a favourable prognosis.[3]

Conventional restoration methods, such as removable dentures, are often unable to fully restore the function and comfort of a natural tooth, which in turn can limit improvements in the patient's quality of life. Partially removable dentures supported by implants have better patient satisfaction and quality of life compared to partially removable dentures with distal extensions.[4] Dental implants have revolutionised restorative dentistry since their introduction, providing a long-term and stable solution for replacing missing teeth. Implants serve as artificial tooth roots that integrate with the jawbone

(osseointegration), providing a solid foundation for the restoration of fixed teeth, such as crowns and bridges, or for supporting overdenture dentures. Oral health, and consequently, the quality of life, improved globally after oral treatment with implants.[5] People with partial teeth who have difficulty accepting tooth loss tend to feel less confident, limit their food choices, eat less, avoid laughing in public, and avoid close relationships compared to those who don't have trouble accepting tooth loss.[6]

The quality of life for patients with total dentures who received dental implants improved substantially, and having more fixed teeth helped them recover their chewing function properly.[7] This case report aims to analyze the functional, aesthetic, and psychosocial improvements observed in a patient after implant therapy. therapy.

CASE REPORT

A 63-year-old female patient presented with a complaint of not being able to chew properly on the right side of the lower back for approximately 15 years. Now the patient wants the tooth to be replaced with a fixed denture. Patients who have had implants before often report that their quality of life has improved. Patients don't like dentures because they feel uncomfortable. The patient does not have bad habits such as bruxism and clenching. The patient's general condition was good, and no abnormalities were found on the extraoral examination. The patient does not have a systemic disorder but has a a history of breast cancer treatment 15 years ago and has now stopped treatment. The patient has no known allergies. Intraoral examination shows good oral hygiene conditions with minimal plaque and calculus. The tooth lost due to extraction is the lower right molar tooth (teeth 45, 46).

In the panoramic view, the shape and size of the teeth on both the upper and lower jaws appear within normal limits. There is agenesis/missing in teeth 18,21,28,38,37,45,46,48. Dental implant on edentulous 21.37. Root canal treatment (RCT) in teeth 15,12,24,25,26,36,35. Restoration of fixed crowns in teeth 24,25,26,36,35,34,47. Deposits on teeth 16,15,14,13,12,11,22,27. The height of the alveolar bone crest in the upper jaw and lower jaw is within normal limits—description of the maxillary sinuses and other anatomical structures within normal limits (Figure 1a).

The results of the examination of regions 45 and 46 showed that the gingiva was broad and thick, as well as normal—edentulous 45, and there were visible alveolar bones within normal limits. Measurements were made at 4.0 mm from

the cervical distal root of tooth 44; the thickness of the alveolar bone was 5.3-14.6 mm, and the height of the alveolar bone was 13.5 mm: edentulous 46, visible alveolar bones within normal limits. Measurements were made at 8.0 mm from the cervical mesial root of tooth 47; the thickness of the alveolar bone was 6.5-15.0 mm, and the height of the alveolar bone was 13.8 mm (Figure 1b).

Laboratory examinations showed a coagulation profile with EN 14.6 seconds (slightly above normal 9.1–13.1) and APTT 30.2 seconds (within 14.2–34.2). Hematological parameters were within or slightly below normal limits, with Hb 13.5 g/dL (14–17.4), hematocrit 41% (41.5–50.4), WBC 6.1/mm³ (4.4–11.3), RBC 4.36 million/µL (4.5–5.9), and platelets 204,000/mm³ (150,000–450,000). Blood chemistry revealed SGOT 12 U/L (below 15–37 U/L), SGPT 10 U/L (below 16–63 U/L), and random blood glucose 85 mg/dL (<140 mg/dL). Electrolytes showed sodium 137 mEq/L (135–145), potassium 3.3 mEq/L (slightly below 3.5–5.1), while kidney function was within normal range with urea 17 mg/dL (15–39) and creatinine 0.9 mg/dL (0.6–1.5).

The patient's treatment plan includes the removal of plaque and calculus, followed by the placement of dental implants and the restoration of crowns. The type of implant chosen is a bone-level implant from BioHorizon, with a diameter of 4.6 mm and a length of 10.5 mm. The implant uses a straight-type abutment and is covered with a Porcelain-Fused-to-Metal crown.

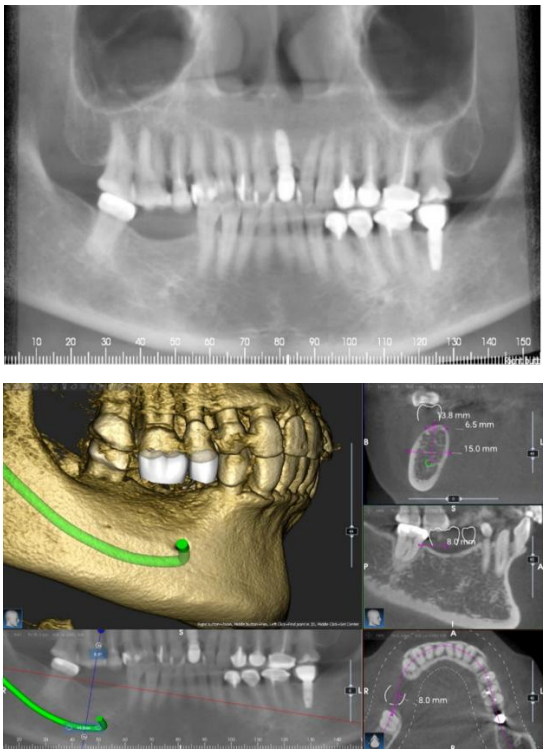

Figure 1. Pre-operative Panoramic Radiography and Pre-operative CBCT Display.

Surgical Phase I

Preparation of tools and materials is carried out. Asepsis is performed with betadine and followed by topical anesthesia and infiltration anesthesia. Local Infiltration Anesthesia with lidocaine and epinephrine 1:100000 in buccal vestibulum and lingual regio 45,46. The incision on the

buccal side with blade number 15, starting from the buccal sulcus 48, tracing the crestal peak of regio 45.46 to the buccal sulcus 44. Unveiling full full-thickness mucoperiosteal envelope flap is performed on the buccal and lingual sides with rasparatorium so that the surgical area is clearly visible—smoothing of the top of the bone region 45.46 with the bone file. Areas of operation are marked using a surgical guide and a Lindeman bur, which is rotated at 1000rpm until it marks the bones. The drilled alveolar bone bleeds normally and is cleaned with a saline solution. Drilling continued with widening and deepening of the marking using a pilot drill 2.0 and depth drill 2.5mm to a working length of 10.5mm, and then continued with a width increasing drill of 3.2mm and 4.1mm to a working length of 10.5mm with a speed of 1000 RPM and torquence 30 Ncm with saline water ON.

Parallel pins are used to check the alignment of implants 45, 46 and adjacent teeth. The position of the implant at half the length of the work is good, so drilling continues to install a yellow depth gauge, and it ends with agreen gauge. Drilling was performed using a crestal bone drill to prepare the patient's crestal bone area. Implants with a diameter of 4.6 mm and a length of 10.5 mm are inserted with *a* handpiece connector at a speed of 25 rpm until they leave 2 mm threads over the bone. Implant installation is followed by a wrench and ratchet at a torque of 35 Nm. Primary stability is obtained from implant installation. The screw cover is installed in green, and the stitching is done with 4.0 nylon thread. A radiographic examination is performed to evaluate implant placement (Figure 1). The implant is embedded in the bone in a position parallel to the adjacent teeth. Patients were scheduled to remove sutures ten days postoperatively and control three months after implant insertion with surrounding tissue (Figure 2). Ten Paracetamol 500mg tablets are given to manage postoperative pain.

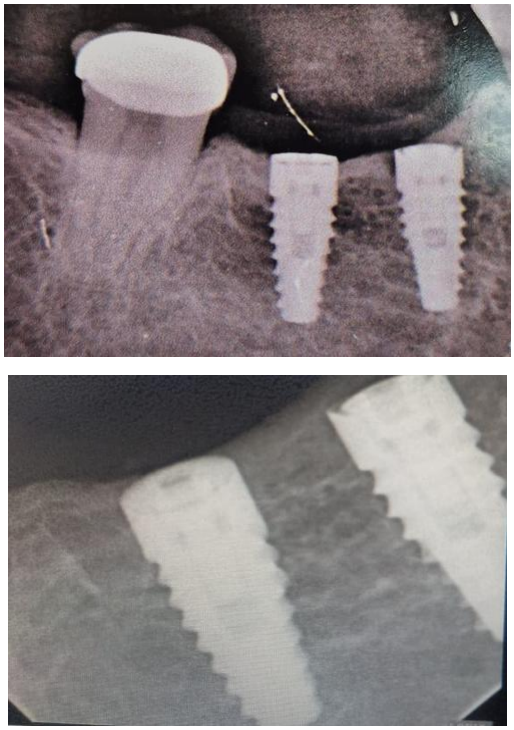

Figure 2. Implant Installation and Implant H+3 Months.

Surgical Phase II

The results of the clinical appearance evaluation three months after surgery showed that there was no inflammation in the surgical area. The second surgical phase is performed to replace the cover screw with a healing abutment (Figure 3). Local infiltration of a combination of lidocaine and epinephrine of 1:100,000 was performed on the buccal and lingual mucosa. The incision is made to expose at least the screw cover. A healing abutment with a diameter of 4.5 mm and a height of 3 mm was inserted into the implant and left for two weeks.

Figure 3. Stiching after the Installation of Healing Abutment.

Restoration Phase

The patient came back two weeks later. The patient has no clinical complaints; they only feel that something is blocking, but it is not painful. The opening of the *healing abutment* shows a reddish gingival surface with slight ulceration on the distal side. The mucosa around the implant is conical and ready to be printed. Impression coping is installed, and printing continues with the closed tray technique. The prints along with biting notes and upper jaw study models were sent to the laboratory for the manufacture of screw-retained metal porcelain implant crown in C3 color. Then, impression coping was replaced by healing abutment.

Two weeks after taking impression, patients came back for an artificial crown insertion. Porcelain metal imitation crown with screw holes in the occlusal, accompanied by occlusion and light bite fields (Figure 4). The artificial crown is inserted with 35 Nm torque and the screw hole is covered with pipe tape until it is complete and closed (Figure 4). The clinical evaluation seemed good, accompanied by a trial with dental floss on each side and could be passed well. Patients are advised

To maintain oral hygiene, check with the dentist at least once every 6 months to do Dental check-ups and coral cleaning, a healthy and nutritious diet.

Figure 4. Buccal Side of the Crown: 45.46. Screw Hole Filling Display with Teflon Tape.

DISCUSSION

Implant-supported dentures significantly improve oral health-related quality of life in both partially edentulous and completely edentulous patients, with greater improvements observed in the latter.[8] Scientific research conducted by Cooper et al. reported that patients had better dental health after switching from partially removable dentures to partially implant-supported dentures.[9] This study suggests that implants offer more substantial benefits for individuals who face the most significant challenges due to the loss of an entire tooth. These findings underscore the implant's ability to restore stability and function that is often unattainable with conventional dentures, thus directly positively impacting essential aspects of patients' daily lives. Dental implants offer a functional, stable, and aesthetically pleasing solution, making them the "gold standard" for the rehabilitation of missing teeth for many patients and dentists.[10]

This article reports the case of a woman with a good educational and economic background. The reason for choosing implants over removable dentures is that patients who have already had implants installed have experienced a sense of satisfaction. There is a fear among patients that removable dentures will come loose when eating or talking. This article aligns with previous research, which states that implant-supported removable prostheses are more successful in terms of patient satisfaction, prosthesis stability, retention, and chewing strength compared to conventional complete dentures.[11]

The second phase of surgery continued for 3 months after the implant was installed. Osseointegration usually takes three to six months, during which time the implant is at risk of looseness.[12] Various factors that affect the rate and success of osseointegration can be categorised as

factors related to implant characteristics, such as macro and micro physical and chemical design of the implant, or bone characteristics, such as bone count and quality as well as local and systemic host conditions, timing, or protocols followed for functional loading of dental implants.[13]

A comprehensive evaluation should be performed on each patient who will use dental implants.[14] Dental implants in patients with systemic diseases can be successful, but success depends on maintaining oral hygiene, avoiding smoking, and avoiding risk factors.[15] The patient in this case is 63 years old with good systemic condition and has a history of taking anti-cancer drugs 15 years ago. The patient does not have bad habits such as drinking alcohol, clenching, bruxism or smoking. The oral cavityis health is well-maintained. Patients routinely use dental floss, and there are no anomalies in the oral cavity. Conditions such as the width of the gums in the area where the implant will be installed are also classified as good and sufficient, namely mesiodistal distance 45 is 7 mm and alveolar crest height 45 is 6 mm; while mesiodistal 46 is 6 mm, and its alveolar crest height 46 is 7mm. The above data show that the patient does not have implant failure factors.

The implants are torque to ensure mechanical stability, prevent biological and mechanical complications, and support the formation and function of biological width that protects the tissue around the implant. Lowinsertion torque values are associated with early dental implant failure, making them nearly 14 times more likely to occur than implants placed with a torque of 30 N-cm or greater.[16] The selection of an implant diameter of 4.6 mm and a length of 10.5 mm is based on the stability of this case. The diameter of the dental implant is more important than its length in reducing the distribution of bone stress and improving the stability of the implant under both static and immediate load conditions.[17] Short dental implants were significantly associated with premature implant loss, while no significant association was observed between bone quality or implant diameter.[18] The placement of the implant 0.5 mm below the cortical bone, with a lower thickness, exhibits the best biomechanical and histological behaviour in terms of new bone formation, improved mechanical stability, and optimal osseointegration.[19]

The selection of healing abutment height in the posterior mandibular should be tailored to the needs of both soft and hard tissues, but clinical evidence suggests that a healing abutment with a height of 2 mm

provides good results in maintaining marginal bone stability in the posterior area of the mandible, especially when installed concomitantly with implant placement and in cases with limited keratinised mucosa.[20] In this case, the diameter of the healing abutment used is 4.5 mm with a height of 3 mm. In general, a healing abutment with a height of 2-3 mm and a diameter corresponding to the width of the posterior alveolar of the mandibula is recommended to support optimal healing and minimise bone resorption and changes in soft tissue volume.[21]

The selection of crowns for the 45 and 46 mandibular dental implant cases should consider several important factors, such as mesiodistal dimensions, crown-to-implant ratio, material type, and prosthetic design. A recent study by Wang et al. recommends a mesiodistal distance between the implant and neighbouring teeth of approximately 7–7.4 mm for the second premolar and 8–8.5 mm for the first molar, to ensure sufficient space for restoration and the health of peri-implant tissue.[22] Overall, porcelain-fused-to-metal crown remain an excellent choice for implant restoration in the posterior mandible due to their combination of strength, reliability, and consistent clinical outcomes.

Complete dental restoration procedures can significantly improve the quality of life, particularly in terms of psychological discomfort and pain, while also potentially affecting speech and taste.[23] Dental implants not only focus on the physical aspects of restoration, but also play a crucial role in restoring the emotional and social aspects of a patient's quality of life that were previously disrupted by tooth loss. Implant-prosthetic interventions effectively improve the quality of life and perceived aesthetics for patients undergoing oral rehabilitation.[24] Overall, scientific evidence consistently supports the notion that dental implants are a superior treatment modality for restoring missing teeth, not only from a functional and aesthetic perspective, but also as a powerful intervention to improve patients' quality of life comprehensively.

Implant-supported dentures, including complete overdentures or hybrid prostheses, significantly improve the quality of life of edentulous patients compared to conventionally removable complete dentures.[25] Dentists can educate patients and encourage them to choose implants over removable dentures, as implants offer more benefitsatients with removable dentures have a higher awareness of dental implants (61%). This awareness increases as the patient's level of education rises.[26]

CONCLUSION

This case report demonstrates that dental implants are a reliable treatment option for restoring missing teeth, providing functional stability, aesthetic outcomes, and improved quality of life. The successful management of this patient supports the role of implants as a preferred choice in oral rehabilitation, especially in individuals with good systemic and oral conditions.

CONFLICT OF INTEREST

The authors reported no potential conflict of interest.

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