

Frequency of Immediate Implant in Aesthetic Zone

¹Maha Mohammed Al-Sayyid, ²Menen Shamil Mahmood and ³Hussien Mohammed Maktouf

^{1,3} Department of Dentistry, Al-Hadi University College, Baghdad, Iraq,
²Department of Surgery, Ministry of Health, Baghdad, Iraq.

Corresponding author: Maha Mahmoud Al-Sayyid

E-mail: maha.m@huc.edu.iq

Received 12 August 2022.

Accepted for publication on May 10, 2023.

Published December 21, 2023.

DOI: <https://doi.org/10.58827/892441bgxzro>

Abstract

Background immediate dental implant treatment is a well-established strategy. It preserves the bone and reduces treatment time. It also allows the preservation of the soft tissues as well as enables enhancement of the overall aesthetics. Technically, immediate placement of the implant is a challenging task and can be done by clinicians possessing extensive experience in implant dentistry, both prosthetically as well as surgically. **Objectives** This descriptive study aims to assess the frequency of immediate implants placed in the aesthetic zone of the maxilla and mandible about the site, gender, and age of a group of Iraqi patients. **Materials and Methods** This study has been carried out in the Modern Specialized Dental Clinic from January 2019 to March 2022. One hundred patients were included in this study with a total number of 372 implants. Bibliographic information as well as radiographic information taken at the time of implantation were taken from the center record for all patients involved in this study. **Results** female-to-male ratio in this study was 1.63:1. The highest percentage (38.3%) of implants was found in the female esthetic zone within the 41-50 age group. The most favorable side of implantation for the esthetic zone was found in the right maxilla (44%) for the same age group (41-50). **Conclusions** there is a female predilection for immediate implantation in the maxillary aesthetic zone, middle-aged females in particular.

Keywords: Dental prosthesis; Immediate implant; Aesthetic Zone.

Introduction

Missing teeth in the aesthetic zone may impact a person's smile. Given the importance of a smile in the day-to-day life of a person (middle-aged women in particular) (Kannaiyan, 2021) therefore could be a traumatic experience when there is a loss of a tooth in the aesthetic zone with or without compromising the phonetics. Thus, quick replacement of the implant-supported single tooth is regarded to be a major challenge

for a clinician. Conventionally, the maturation of the extraction socket needs almost 3–4 months of the healing period. Regarding prosthetic treatment, patients seeking to replace a lost tooth generally wait for >6 months (Buser, 2017). To reduce the treatment period, efforts have been made by adopting approaches like immediate or early loading after placing the implant, immediate implant placement, early or immediate loading as well as immediate placement of the implant

in a fresh extraction site (Wong Lee. 2021). To carry out implantation in delayed post-extraction approaches successfully, primary implant stability is still regarded to be a key requisite (Al-Samman, 2022). In The osseointegration process, biological stability gradually substitutes primary mechanical stability. After completing the healing phase, biological stability completely substitutes primary mechanical stability (Gupta 2019; Gultekin, 2016). The phenomenon of osseointegration with the alveolar bone in the surrounding tissue determines the success of immediately placing the implant at the extraction site (Parithimarkalaigan, 2013). Modifying the tissue architecture may concern that good results can be achieved. These alterations with regards to tissue architecture happen post or before the extraction process via gingival recession that facilitates the loss of buccal or interproximal tissue, or via bone remodelling or resorption (Budhiraja, 2021).

Materials and Methods

Study sample: In this descriptive retrospective study of 100 patients who attended a private dental implant clinic (Modern Specialized Dental Clinic) in Baghdad from 2019-2022. Their information was recorded as follows: age, gender, and implant zone (upper anterior, upper posterior, lower anterior, and lower posterior). The esthetic zone was considered as the area from the canine to the canine (Feher, 2022). The implant system used during the study period was the (Endosseous Dental Implant System S-Systems) (IHDE Dental) (IHDE Dental Catalogue 2021).

Inclusion criteria:

1. Patients aged ≥ 20 years of both genders.
2. Patients with non-restorable single or multiple maxillary teeth (canines, incisors, and premolars) are indicated for edentulous or extraction.
3. Medically fit patients with controlled medical conditions who do not have local or systemic conditions that can risk dental implant surgery and bone healing potential.

Exclusion criteria:

1. Patients who are contraindicated for dental implant surgery, including immune-compromised patients, those who experienced a recent myocardial infarction, have uncontrolled diabetes, and patients undergoing chemotherapy or radiotherapy in the head and neck region.
2. Patients who cannot achieve primary stability because of severe alveolar bone resorption.
3. The patient showing signs of acute infection as well as purulent exudates in the extraction zone as identified via radiographical and clinical examination.
4. Patients who possess no or a gap of ≤ 2 mm near the inserted dental implant.

Statistical Analysis

Frequency distributions have been depicted, as a table. Distributions also have been displayed using percentages and the mean of all variables included in this study.

Results

The average age was 40 ± 20 years old (ranging from 20 to 60). Males were 38(38%), whereas females were 62(62%) Table (1). The distribution of patients' ages is displayed in Table (2). The age ranges from 20 to 60 years, with the highest percentage belonging to 41-50 years. As shown in Table (3), the highest number of implants was reported in the age group 50-60. Most of the cases were full arch, or half arch implants, with the highest percentage in the left maxilla, whereas the lowest percentage was distributed equally between the mandible right and left. The lowest number of implants was found in the age group 20- 30. The most favorable side of implantation in the esthetic zone was found in the right maxilla of the age group (41-50), whereas the lowest percentage of implants was reported in the left mandible. As illustrated in Table (4), the highest proportion of implants in the 51- 60 age group was equally distributed between the posterior maxilla and posterior mandible. The lowest percentage of cases was found in the anterior mandible. In age group 20-30

the lowest proportion of implants was found in the anterior mandible. Comparable percentages were also found in the same location for the age groups 31-40 and 41-50. The highest number of implants in the aesthetic zone was reported in females aged 41-50 in Table (5).

Table (1): Total implant distribution in males and females from 2019- 2022.

| Year of implant | Males | Females | Total number Patients |
|-----------------|-----------|------------|-----------------------|
| 2019 | 4 (57.1%) | 3 (42.9%) | 7 |
| 2020 | 7 (25.9%) | 20 (74.1%) | 27 |
| 2021 | 25 (42.4) | 34 (57.6%) | 59 |
| 2022 | 2 (28.6%) | 5 (71.4%) | 7 |
| Total | 38 | 62 | 100 |

Table (2): Distribution of the patients according to age and gender.

| Age | Gender | | Total |
|--------------|------------|------------|------------|
| | Males | Females | |
| 20-30 | 11 (40.7%) | 16 (59.3%) | 27 |
| 31-40 | 13 (39.4%) | 20 (60.6%) | 33 |
| 41-50 | 7 (25%) | 21 (75%) | 28 |
| 50-65 | 7 (58.3%) | 5 (41.7%) | 12 |
| Total | 38 | 62 | 100 |

Table (3): Total implant distribution in the maxilla and mandible according to age.

| Age | Maxilla | | Mandible | | Total number of implants |
|--------------|------------|------------|------------|------------|--------------------------|
| | Right | Left | Right | Left | |
| 20-30 | 9 (21.4%) | 21 (50%) | 7 (16.7%) | 5 (11.9%) | 42 |
| 31-40 | 29 (34.2%) | 25 (29.4%) | 15 (17.6%) | 16 (18.8%) | 85 |
| 41-50 | 44 (37.6%) | 43 (36.8%) | 21 (17.9%) | 9 (7.7%) | 117 |
| 50-65 | 34 (26.3%) | 36 (28.1%) | 29 (22.7%) | 29 (22.7%) | 128 |
| Total | 241 | | 131 | | 372 |

Table (4): Total implant distribution in age groups according to their location in the anterior or posterior zone in the maxilla and mandible.

| Age | Maxilla | | Mandible | | Total |
|--------------|------------|------------|------------|------------|------------|
| | Anterior | Posterior | Anterior | Posterior | |
| 20-30 | 10 (23.7%) | 18 (42.9%) | 2 (4.8%) | 12 (28.6%) | 42 |
| 31-40 | 35 (41.2%) | 25 (29.4%) | 3 (3.5%) | 22 (25.9%) | 85 |
| 41-50 | 32 (27.4%) | 50 (42.7%) | 4 (3.4%) | 31 (26.5%) | 117 |
| 50-65 | 28 (21.9%) | 42 (32.8%) | 16 (12.5%) | 42 (32.8%) | 128 |
| Total | 107 | 135 | 25 | 105 | 372 |

Table (5): Total number of implants in esthetic zone.

| Age | Maxilla | | Mandible | | Total |
|--------------|------------|------------|------------|-----------|------------|
| | Males | Females | Males | Females | |
| 15-30 | 7 (43.75%) | 7 (43.75%) | 0 (0%) | 2 (12.5%) | 16 |
| 31-40 | 12 (33.4%) | 21 (58.3%) | 0 (0%) | 3 (8.3%) | 36 |
| 41-50 | 2 (5.6%) | 30 (38.3%) | 1 (2.8%) | 3 (8.3%) | 36 |
| 50-65 | 23 (52.3%) | 5 (11.4%) | 13 (29.5%) | 3 (6.8%) | 44 |
| Total | 44 | 63 | 14 | 11 | 132 |

Discussion

Immediate placement of the implant can act as a treatment option only when clinical criteria are met stringently, like the integrity of the adjacent teeth's bone peaks, the buccal bone plate integrity, thick gingival biotype, integrity of soft tissue (adequate amounts of keratinized gingiva, interdental papillae, and gingival scallop) (Quirynen, 2007). This approach provides several benefits such as shorter treatment times, similar survival rates when compared with the delayed implantation procedures (Wong Lee, 2009), and a decrease in the number of invasive surgeries, subsequently mitigating patient discomfort as well as preserving the height and width of buccal bone as well as soft tissues profile (Perez, 2018) and nearly no disadvantage versus traditional approaches. The most prominent disadvantages include delay in early bony support with a gap between the fixture and the extraction socket as well as likely deficiencies concerning the peri-implant keratinized gingiva, which could raise the risk of implant loss and infection (Perez, 2018).

The phenomenon related to integration with surrounding tissue determines the success of immediately placing the implant at the extraction site (Parithimarkalaignan, 2013). By modifying the tissue architecture, the primary concern regarding to maintaining good results can be achieved. These alterations with regards to tissue architecture may happen post or before the tooth extraction process via gingival recession that facilitates loss of buccal or interproximal tissue, or via bone remodelling or resorption (Budhiraja, 2021). Various proposed benefits are involved in the immediate implant placement as well as restoration of a single implant in the aesthetic zone, such as fewer surgical procedures, decreased overall treatment time, greater patient satisfaction, and less traumatic surgery in this treatment (Mehta, 2015; Nørgaard, 2022). The patient needs to be informed regarding the aesthetic risk involved in the implant process when choosing the maxillary anterior single-tooth implant therapy. Numerous single implants were carried out connected to the aesthetic zone in our study, wherein we considered suitable surgical and restorative procedures, careful case selection, clinical experience, and suitable implant design and surface (Meng, 2021; Brägger, 2005; Negri, 2014). A key role is played by the anterior maxilla, also referred to as the aesthetic zone, in the smile and facial aesthetics. With regards to a dental implant, this study evaluated the frequency referred to implant treatments with a focus on the aesthetic zone of patients. Both functional osseointegration and satisfactory aesthetic outcomes are key to the success of dental implant therapy in the aesthetic zone. It is very difficult to maintain balance, harmony, and continuity of gingival architecture between the adjacent natural dentition and implant restoration. Also, it should be noted that this is a complex procedure that needs high surgical skills, even when all the clinical conditions concerning immediate placement are set (Buser, 2017). The current study also aimed to assess the impacts cast by age during implantation on gender. It was found that higher implantation

was recorded for the age group 31-40 years amongst female predilection with regards to all age groups (Alhamdani, 2021; Álvarez-Camino, 2013). For implant restoration, age is regarded to be a key factor, since it is a fact that with ageing bone, mass density also decreases, which is common with age-related osteoporosis in both female and male patients. Age-related bone loss is prominent in the cancellous compartment due to several mechanisms like direct control of osteoclast activity on trabecular bone as well as increased oxidative stress but has been found to limitedly impact cortical bone (Guarnieri, 2013). In the current study, the high prevalence related to the placement of implants in the anterior maxilla also signifies a high incidence of anterior tooth loss, which could be because of poor oral hygiene or trauma (Rasouli Ghahroudi 2015; Alhamdani, 2021). Regarding implant therapy in the aesthetic region, the most challenging goal would be maintaining the hard and soft tissue stability for a long duration. A commonly reported complication post-immediate placement of the implant is the midfacial mucosal recession. When implants are placed in the cingulum position, it often leads to a gap between the labial cortical plate and the implant. Histological and clinical studies have reported significant changes in ridge dimension after tooth extraction, while bone augmentation is regarded to be optimum in encouraging bone fill as well as the resolution of defects at immediate implant sites (Kim, 2022; Khzam, 2015).

Conclusions

There is a female predilection for immediate implantation in the maxillary aesthetic zone, middle-aged females in particular.

Acknowledgements Thanks to the co-authors for their support and special thanks to the Modern Specialized Dental Clinic to the Director of the Dental Department In Al Hadi Collage and with all respect to the Dean of Al Hadi Collage

References

- Alhamdani F, Abdulla EH. 2021 Influence of Patient's Age and Gender on Dental Implant Treatment Five Year Retrospective Study. *Journal of Medical Research and Health Sciences*. Sep 22;4(9):1461-7. <https://doi.org/10.52845/JMRHS/2021-4-9-5>
- Al-Samman AA, Al-Rawee RY, Tawfeeq, BA. 2022 Does Primary Stability is Mandatory for Dental Implant Success? A Systematic Review of Literature. *J Dent Oral Sci.*; 4(1): 1-16. [https://doi.org/10.37191/Mapsci-2582-3736-4\(1\)-121](https://doi.org/10.37191/Mapsci-2582-3736-4(1)-121)
- Álvarez-Camino JC, Valmaseda-Castellón E, Gay-Escoda C. Immediate implants placed in fresh sockets associated with periapical infectious processes. A systematic review. *Med Oral Patol Oral Cir Bucal*. 2013 Sep 1;18(5):e780-5. <https://doi.org/10.4317/medoral.18942>
- Brägger U, Karoussis I, Persson R, Pjetursson B, Salvi G, Lang NP. 2005 Technical and biological complications/failures with single crowns and fixed partial dentures on implants: a 10-year prospective cohort study. *Clinical Oral Implants Research*. Jun;16(3):326-34.
- Budhiraja D, Sheoran L, Sharma S, Loli AC, Udhey C, Sehrawat M. 2021 A literature review on immediate implant Budhiraja placement. *IP Annals of Prosthodontics and Restorative Dentistry*. Jun 15;7(2):68-71.
- Buser D, Chappuis V, Belser UC, Chen S. Implant placement post extraction in esthetic single tooth sites: when immediate, when early, when late? *Periodontol 2000*. 2017 Feb;73(1):84-102. <https://doi.org/10.1111/prd.12170>
- Feher B, Frommlet F, Ulm C, Gruber R, Kuchler U. Preoperative buccal bone volume predicts long-term graft retention following augmentation in the esthetic zone: A retrospective case series. *Clin Oral Implants Res*. 2022 May;33(5):492-500. <https://doi.org/10.1111/clr.13909>
- Guarnieri R, Ceccherini A, Grande M. Single-tooth replacement in the anterior maxilla using immediate implantation and early loading: clinical and aesthetic results at 5 years. *Clin Implant Dent Relat Res*. 2015 Apr;17(2):314-26. <https://doi.org/10.1111/cid.12111>
- Gultekin BA, Sirali A, Gultekin P, Ersanli S. Clinical evaluation of the stability of implants placed at different supracrestal levels. *J Istanbul Univ Fac Dent*. 2016 Oct 1;50(3):21-31. <https://doi.org/10.17096/jiufd.96003>
- Gupta G, Gupta DK, Gupta N, Gupta P, Rana KS. Immediate Placement, Immediate Loading of Single Implant in Fresh Extraction Socket. *Contemp Clin Dent*. 2019 Apr-Jun;10(2):389-393. https://doi.org/10.4103/ccd.ccd_565_18
- Kannaiyan K, Prasad V, Chander VB, Avinash R, Kouser A . 2021 Esthetic and Palliative Management of Congenitally Missing Anterior Teeth using All Ceramic Fixed Prosthesis: A Clinical Case Report. *J Pharm Bioallied Sci*. Nov;13(Suppl 2):S1737-S1740. https://doi.org/10.4103/jpbs.jpbs_288_21
- Khzam N, Arora H, Kim P, Fisher A, Mattheos N, Ivanovski S. 2015 Systematic review of soft tissue alterations and esthetic outcomes following immediate implant placement and restoration of single implants in the anterior maxilla. *Journal of periodontology*. Dec;86(12):1321-30. <https://doi.org/10.1902/jop.2015.150287>
- Kim JC, Lee M, Yeo IS. 2022 Three interfaces of the dental implant system and their clinical effects on hard and soft tissues. *Materials Horizons*.;9(5):1387-411. <https://doi.org/10.1039/D1MH01621K>
- Mehta H, Shah S. Management of Buccal Gap and Resorption of Buccal Plate in Immediate Implant Placement: A Clinical Case Report. *J Int Oral Health*. 2015;7(Suppl 1):72-5.

Meng HW, Chien EY, Chien HH. 2021 Immediate implant placement and provisionalization in the esthetic zone: a 6.5-year follow-up and literature review. *Case Reports in Dentistry*. Sep 15;. Doi: <https://doi.org/10.1155/2021/4290193>

Negri M, Galli C, Smerieri A, Macaluso GM, Manfredi E, Ghiacci G, Toffoli A, Bonanini M, Lumetti S. 2014 The effect of age, gender, and insertion site on marginal bone loss around endosseous implants: results from a 3-year trial with premium implant system. *BioMed Research International*. Aug 12;2014. <https://doi.org/10.1155/2014/369051>

Nørgaard Petersen F, Jensen SS, Dahl M. Implant treatment after traumatic tooth loss: A systematic review. *Dent Traumatol*. 2022 Apr;38(2):105-116. <https://doi: 10.1111/edt.12730>

Parithimarkalaignan S, Padmanabhan TV. Osseointegration: an update. *J Indian Prosthodont Soc*. 2013 Mar;13(1):2-6. <https://doi: 10.1007/s13191-013-0252-z>.

Perez A, Valente NA, Trottet L, Chatelain S, Fortunato A, Barone A. 2018 Immediate Implants in the esthetic area: Our perspective and guidelines. *Journal of Oral Science & Rehabilitation*.;4(1):16-23. 23

Quirynen M, Van Assche N, Botticelli D, Berglundh T. 2007 How does the timing of implant placement to extraction affect outcome?. *Database of Abstracts of Reviews of Effects (DARE): Quality-assessed Reviews [Internet]*.

Rasouli Ghahroudi AA, Homayouni A, Rokn AR, Kia F, Kharazifard MJ, Khorsand A. Frequency of Dental Implants Placed in the Esthetic Zone in Dental Clinic of Tehran University: A Descriptive Study. *J Dent (Tehran)*. 2015 Dec;12(12):906-12

Wong Lee . 2009 Immediate implant placement in fresh extraction sockets: a clinical report. *International Journal of Oral & Maxillofacial*

Implants. Apr 1;24(2). <https://doi.org/10.5125/jkaoms.2021.47.1.57>

Wong Lee. 2021 Immediate implant placement in fresh extraction sockets. *J Korean Assoc Oral Maxillofac Surg*. Feb 28;47(1):57-61. <https://doi: 10.5125/jkaoms.2021.47.1.57>