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Is immediate implant placement advantageous for the management of aggressive periodontitis patients in maxillary esthetic zone? An update of systematic reviews

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ABSTRACT

Aim To determine the clinical safety, survival and success of the immediate dental implant placement in aggressive periodontitis patients.
Materials and methods In April 2019, Pubmed, Cochrane central database, Web of Science, Lilacs and hand search were searched with no restrictions for language, publication date or follow up period. All types of prospective studies reporting the prognosis of immediate implant placement were included. Outcomes were implant survival rate, complications during placement and postoperatively and marginal bone loss around implants.
Results After screening of the titles, abstracts and full text of the reported studies, none of those met the pre-determined inclusion criteria.
Conclusions There was no sufficient evidence regarding the survival rate of immediately placed dental implants in patients affected with aggressive periodontitis. Long term prospective double armed clinical studies are recommended.

KEYWORD Aggressive periodontitis, Immediate implant placement, Systematic review.

INTRODUCTION

Achieving an attractive ideal smile has turned as the main goal for most individuals especially patients suffering from periodontal disease. Aggressive periodontitis, descriptively is an inscrutable disease that manifests by indeterminable periods of periodontal tissue destruction. It mainly affects youth with distinguishable progressive exacerbation periods. There is no intimate relationship between the amount of infective deposits and the rate of bone destruction. It results in unaesthetic smile, malocclusion and marked functional discrepancy (1, 3).
The inability to identify the main causative factors behind such disease could be the reason behind missing the ideal treatment protocol. Treatment is usually the interplay of different factors. As per microbial hypothesis, P. gingivalis and Aggregatibacter actinomycetem comitans were considered as the initiators (1, 2).
Afterwards, the genetic background was used to describe the familial behavior of the disease (4). Due to the high cost-effectiveness, the genetic treatment is completely excluded especially in developing counties.
Additionally, several researches aimed to clarify the reason behind the hindered body response. Reduced functions of the immune cells and production of massive amounts of catabolic cytokines were reported. Furthermore, uncontrollable release of massive amounts of matrix-metalloproteinases was detected. Host modulators were recommended to control the release of the destructive agents and limit the disease activity (5, 6).
When dealing with aggressive periodontitis patients, immediate implant placement exhibits an effective modality that abbreviates the surgical time frame. It also provides proper implant positioning to counteract the advanced bone resorption following extraction (7, 8).
In general, peri-implantitis is a predictable event when treating patients with history of periodontitis in comparison

to delayed technique. Meticulous precautions should be performed pre-operatively in order to control post-operative complications. Chemical and mechanical control of periodontitis is an essential step to control periodontitis regardless of its type (3, 9, 10, 11).

In 2005 and 2007, Mengel et al. (9, 10, 12, 13) have reported the long term success rate (83.33%) of immediately placed implants in aggressive periodontitis patients along 10 years of follow up.

On the other hand, Swierket et al. (2012) (11) assessed the peri-implant mucositis and peri-implantitis rate in aggressive periodontitis patients. They found that the implant survival rate was statistically insignificant with comparable clinical success rate.

Immediate placement usually gains popularity attributable to the technique simplicity and limited surgical time. According to published literature, several systematic reviews discussed the efficacy of delayed implant placement aggressive periodontitis. Currently, the literature does not address short or long term treatment outcomes regarding immediate placement.

The present systematic review aims to evaluate the evidence supporting the survival rate of immediately placed implants in patients with aggressive periodontitis supporting or limiting its performance.

METHODS

The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA guidelines) was followed during the search protocol (Fig. 1).

The systematic search was performed aiming to answer the focused question: "In aggressive periodontits patients, what is the survival rate of the immediately placed dental implants versus periodontally healthy individuals in the maxillary esthetic zone?".

PICO elements

Participants (P): Patients with hopeless teeth seek for immediate implant placement.

Types of interventions and comparisons (I and C): The intervention was determined as immediate implant placement in aggressive periodontitis patients. While the comparator was the immediate placement in periodontally healthy individuals. Studies reporting delayed implant placement were excluded.

Types of outcome measures (O):

- 1st outcome: Survival rate of the immediately placed implants;
- 2nd outcome: Radiographic interproximal marginal peri-implant bone loss (radiographic assessment).

Search strategy

Electronic data bases (PubMed, Cochrane central databases, JBI data base of systematic reviews and implementation reports, EBCAI evidence-based communication assessment and intervention, Web of sciences and Lilacs) were searched in April 2019. Hand search in Google scholar data base, specialized journal databases (journal of periodontology, periodontology 2000, clinical periodontology) and bibliography of full text articles was performed. No language restrictions were applied. The search yielded 56 articles in total.

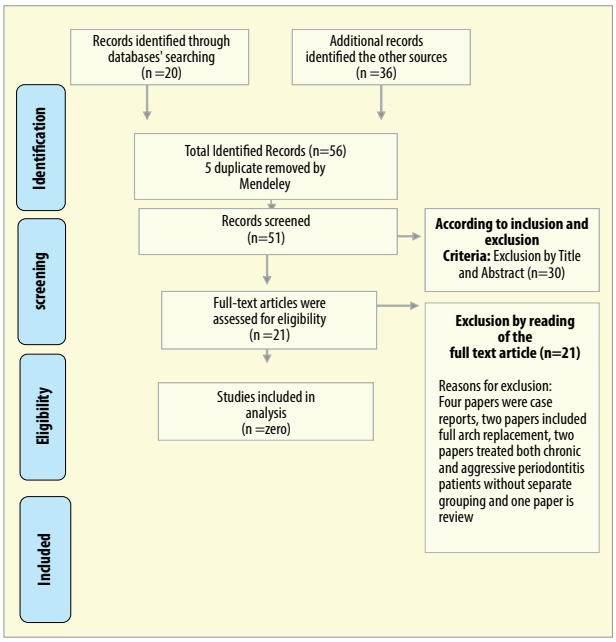

FIG. 1 PRISMA flow chart

Publication selection

Titles and abstracts of the relevant studies were reviewed based on the inclusion criteria. Screening process was performed. Checking the full text of 21 studies was performed to exclude the irrelevant articles.

Study design selection and inclusion criteria

The relevant studies were categorized as randomized clinical trials, non-randomized clinical trials, prospective studies and case studies. Prospective double arms clinical studies (RCTs, non-RCTs, cohort, case-control studies) that assessed the survival rate of immediately placed dental implants in aggressive periodontitis patients were included. No limitations concerning the follow up period, language or publication date. Owing to reach trustable consensus and due to methodological heterogeneity, authors excluded case reports and retrospective studies.

Unit inclusion criteria

Patients eligible for the trial must comply with all of the following.

1) Patients 18 years and older.
2) Periodontally healthy individuals and aggressive periodontitis patients.
3) Medically healthy.
4) Non-smoker.

No.	study name	Reason for exclusion
1.	De Boever & De Boever (2006) (14)	Prospective single arm clinical study evaluated delayed implant placement in aggressive periodontitis.
2.	Elamrousy et al. (2013) (15)	Prospective single arm clinical study evaluated immediate placement and restoration in all types of periodontitis (including chronic & aggressive periodontitis).
3.	Elamrousy et al. (2014) (15)	Prospective single arm clinical study evaluated immediate placement and restoration in all types of periodontitis (including chronic & aggressive periodontitis).
4.	Elsharkawy and El-Menoufy (2013) (17)	prospective clinical study evaluated immediate placement in patients with chronic periodontitis versus those placed in periodontally healthy patients
5.	Furhauser et al. (2016) (18)	prospective single arm clinical study evaluated immediate placement in patients periodontally healthy patients
6.	Kehl et al. (2011) (19)	prospective clinical study evaluated delayed placement in patients with aggressive periodontitis versus those placed in chronic periodontitis patients
7.	Koh et al. (2011) (20)	prospective clinical study evaluated immediate placement in healthy patients by placing implants at the level of the mariginal bone crest versus placement 1 mm submarginal
8.	Kolerman et al. (2016) (21)	the study was single arm prospective study evaluating the concept of immediate implant placement and nonfunctional loading for use in the esthetically sensitive anterior maxilla in periodontally healthy individuals
9.	Koticha et al. (2012) (22)	prospective clinical study evaluated immediate placement in periodontally healthy patients
10.	Li et al. (2017) (23)	Prospective single arm study aimed to evaluate the feasibility and medium-term outcomes of immediate implant and rehabilitation based on the All-on-4 concept in patients with advanced GAP via clinical and radiographic analyses.
11.	Malo & Nobre (2008) (24)	prospective clinical study evaluated delayed placement in partially edenthulus patients with soft bone
12.	Mengel et al. (2001) (25)	prospective clinical study evaluated delayed placement in patients with aggressive periodontitis versus those placed in chronic periodontitis patients
13.	Mengel & de-Jacoby (2005)a(12)	prospective clinical study evaluated delayed placement following bone augmentation in patients with periodontitis versus those placed in healthy individuals
14.	Mengel & de-Jacoby (2005)a (13)	prospective clinical study evaluated delayed placement in patients with periodontitis (2 groups; aggressive periodontitis group and chronic periodontitis group) versus those placed in healthy individuals
15.	Mengel et al. (2007)a (9)	prospective clinical study evaluated delayed placement in patients with aggressive periodontitis versus those placed in healthy individuals
16.	Mengel et al. (2007)b (10)	prospective clinical study evaluated delayed immediate placement (2-4 weeks) in patients with aggressive periodontitis versus those placed in periodontally healthy patients
17.	Mishra et al. (2011) (26)	clinical report describes the delayed implant placement with aggressive periodontitis patients
18.	Roccuzzo et al. 2010 (27)	prospective clinical study evaluated delayed placement in patients with periodontally affected patients versus those placed in periodontally healthy patients
19.	Schwartz-Arad et al. (2007) (28)	prospective clinical study evaluated immediate placement in general
20.	Slagter et al. (2016) (29)	prospective clinical study evaluated immediate versus delayed placement with delayed loading in patients with labial bony defect
21.	Swierkot et al. (2012) (11)	prospective clinical study evaluated delayed placement in patients with aggressive periodontitis versus those placed in healthy individuals

TABLE 1

5) Immediate Implant placement.
6) Totally edentulous or partially edentulous patients.

Exclusion criteria

Twenty one full text studies were excluded. The reason behind exclusion was mainly the lack of short or long term articles discussing the technique. Deficient information concerning the study design was also great limitation.

Data synthesis

Reviewing and screening process was performed by the help of 2 authors (NY and ARA). Both authors extracted and revised data from the relevant studies independently. No studies retained. Table 1 shows the excluded studies and the reasons behind.

DISCUSSION AND CONCLUSION

Immediate implantation is a critical treatment modality particularly in an uncontrolled destructive disease as aggressive periodontitis. Shortening of treatment schedule, cost effectiveness and appropriate implant placement are the main reasons behind preferring immediate placement. The target of the current systematic review was to assess the survival rate of immediately placed dental implants in aggressive periodontitis patients. Implant survival rate and radiographic interproximal marginal peri-implant bone loss were the measured outcomes. Comprehensive search resulted in no studies meeting the inclusion criteria. There was no evidence standing with or against the probable treatment procedure using prospective either short or long term studies.

Despite the fact that numerous systematic reviews have discussed the role of aggressive periodontitis as a risk factor during delayed implantation, none evaluated the immediate placement. The start was in 2008, Al-Zahrani reported that the survival rate of dental implants placed in aggressive periodontitis patients has questionable survival rate. The results were owing to the impaired host response leading to uncontrolled progression of periodontitis. Regarding the included studies, 89-100% success rate resulted (30). While in 2012, Kim & Sung attributed the increased survival rate in delayed implants placed to adequate control of the infection and personalized maintenance program. The short term success rate recorded 97.4%-100% while the long term success recorded 83.3-96% (31).

In 2014, a systematic review was conducted to assess if aggressive periodontitis is considered a risk factor for implant failure. Nearly equal implant failure results were reported in aggressive periodontitis (3.97), healthy individuals and patients with chronic periodontitis (4.0) (32). While in 2017, Theodoridis et al. (33) concluded that the survival rate of delayed placement in aggressive periodontitis patients was about 97.8% in comparison with 100% of periodontally healthy patients. They also reported that the higher marginal bone loss in aggressive over chronic periodontitis and healthy individuals.

In the light of literature, confidence increased in placing delayed implants in aggressive periodontitis patients with better control of the infection and oral hygiene. In our opinion, the lack of immediate placement short or long term studies is caused by the fear of the high failure rate.

In conclusion, additional randomized clinical trials are needed to support the clinical evidence of immediate implant placement with short, medium and long term outcomes.

Conflict-of-interest and source-of-funding statement

The authors declare that they have no possible and the review was self-funded.

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