Immediate loaded full-arch maxillary rehabilitations in younger vs. elderly patients: a comparative prospective study with 6-year follow up

Abstract

Aim

The aim of this prospective comparative study was to assess whether age has an influence on implant survival in patients treated with implants rehabilitated according to the All-on-4 treatment concept.

Materials and methods

A prospective study was performed with two edentulous patient groups: a younger group (n = x; average age 45 years, 35-50 years) and an older group (n = x; average age 68 years, 60-80 years). Implant and prosthetic failure, biological prosthetic complication, peri-implant marginal bone level changes for survival rates. To compare marginal bone levels between younger and older patients' groups at 6 months and yearly until the 6-year follow-up, Student's t-tests were applied at a significance level of $p < 0.05$.

Results

Fifty-four patients met the eligibility criteria and were included in the study among 78 patients screened; a total of of 216 implants were placed in 54 patients (table 1) and, in total, 54 "all-on-four" rehabilitations were delivered. Implants failure was registered in four patients (4 of 216 fixtures), 2 in YG patients and 2 in an OG; so, an implant failure rate of 1.85% was reported in each group. Peri-implantitis was observed in 7 of 216 implants (3.24%) and 4 of 54 patients (7.41%) (2 from YG and 2 from OG) at the 6-year follow-up. At the 6-year radiographic evaluation, peri-implant crestal bone loss averaged 1.01 ± 0.93 mm for OG and 0.85 ± 1.04 mm for YG. Three of 54 fixed provisional prostheses were fractured during the observation period, representing a prosthetic survival rate of 94.45%

Conclusion

At 6 years of follow-up the significant statistical difference in outcome measures between the two groups is not significant so all-on-4 rehabilitation is indicated in elderly patients in order to improve their quality of life.

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Keywords

Dental Implants, Aged, Osseointegration, Oral Hygiene, Prosthesis Failure, Smoking.

INTRODUCTION

Global demographic trends project a world population of nine billion people by the year 2050, with an annual increase of 50 million individuals. This growth is largely attributed to a combination of factors, including increased life expectancy, reductions in mortality rates, slowed population growth, and rapid urbanization (1). The United Nations, along with various demographic studies, have forecasted that in the United States alone, the population of elderly individuals over the age of 65 will double by 2050 (1). This trend will place a significant demand on healthcare systems, especially in fields related to geriatrics and dentistry, where aging populations often require more specialized care. As people live longer, their dental needs change, with many individuals relying on endosseous implants to retain mandibular overdentures, particularly due to the financial implications of more extensive dental treatments (2).

In clinical research, a growing body of evidence has demonstrated that age-related changes in biological processes significantly affect wound healing, implant osseointegration, and long-term dental outcomes. Serum factors typical of middle-aged and elderly individuals have been identified as contributing factors to altered healing responses, a phenomenon that may impact the success rates of dental implants in these populations (3-5). The aging process brings about several biological changes, including reduced cellular regeneration and bone density, both of which play a critical role in implant integration. Furthermore, a diminished bone formation response to mechanical loading has been observed with advancing age, although it remains unclear if the interaction between aging and mechanical stimuli during regeneration mirrors the adaptation observed in younger individuals (6). This gap in understanding necessitates further research to clarify how these physiological processes interact in the context of dental implants.

Multiple studies focusing on implant rehabilitation in elderly patients have been conducted. However, the majority of these studies are retrospective, and the few prospective studies available are limited by small sample sizes and typically examine single implants or conventional rehabilitation methods (7). This lack of comprehensive, large-scale prospective research makes it difficult to generalize findings across broader populations, particularly when considering more complex procedures such as full-arch rehabilitations. However, despite these limitations, several studies have reported promising results in terms of implant survival and success rates in elderly patients. For instance, Srinivasan et al. conducted a review that reported an impressive 97.7% implant survival rate in elderly patients who underwent traditional implant-supported rehabilitation procedures (8). Such high survival rates challenge the assumption that age alone is a significant barrier to successful implant therapy.

Furthermore, several other studies have indicated that there are no statistically significant differences between younger and older patients in terms of dental implant outcomes, including implant failure rates, peri-implantitis, and prosthetic complications (9-11). This evidence supports the growing consensus that implant-prosthetic rehabilitation is a highly predictable therapeutic option for both partially and completely edentulous jaws, even in scenarios where implant placement is anatomically challenging (9). In particular, the atrophic maxilla presents a common clinical challenge, as the anterior region often retains adequate bone volume while the posterior areas experience severe resorption, leading to reduced bone quantity and quality (12-14). This anatomical limitation has traditionally necessitated the use of bone grafting procedures, which add complexity and length to the treatment process.

However, more recent advancements in implantology have provided viable alternatives to bone grafting in cases of severe maxillary atrophy. A significant development in this area is the “All-on-4” treatment concept, which was popularized by Malò et al. This technique involves the strategic placement of four implants—two placed axially and two tilted posteriorly—to avoid vital anatomical structures such as the maxillary sinuses and the inferior alveolar nerve, without the need for bone grafts (15). By eliminating the need for additional grafting procedures, the All-on-4 technique reduces patient morbidity and shortens treatment times, while still providing stable and predictable outcomes. Numerous clinical studies have reported favorable outcomes for this procedure, with 5- to 10-year follow-up studies demonstrating high success rates and long-term stability (16-18).

Given the increasing popularity of the All-on-4 technique in clinical practice, it is crucial to further investigate how different patient demographics respond to this treatment over time. Specifically, the aim of this prospective study is to compare the long-term outcomes of All-on-4 procedures in younger versus older patients over a 6-year follow-up period. By evaluating implant survival, marginal bone loss, prosthetic complications, and patient-reported outcomes across these two age groups, this study seeks to provide valuable insights into the predictability and success of full-arch rehabilitations in diverse populations. It will also address the potential influence of age-related factors, such as bone quality, healing capacity, and oral hygiene, on the long-term success of the All-on-4 technique. Through this comparison, the study aims to inform clinical decision-making and optimize treatment planning for both younger and elderly patients undergoing implant rehabilitation.

MATERIALS AND METHODS

Patient Selection

This comparative prospective single-centre clinical trial was performed at the Department of Dentistry, IRCCS San Raffaele Hospital, Milan, Italy. The study was conducted in accordance with the tenets of the Declaration of Helsinki and followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for cohort studies (http://www.strobe-statement.org). The ethics committee approval number is CE/INT/10/2015. Patients needing full-arch rehabilitation of maxilla were evaluated according to the following inclusion criteria:

- all patients had to be edentulous or with only a few hopeless teeth in the maxilla and all presented with severe atrophy in posterior regions;
- sufficient residual bone volume to receive four implants;
- all patients had to be an age comprised between 45 and 60 years or equal or more than 75 years;
- all patients had to be independent on help for the activities of daily living;
- all patients had to be in good health.

Exclusion criteria were as follows:

- severe cognitive impairment (dementia);
- poor oral hygiene;
- immunosuppression;
- presence of uncontrolled systemic diseases and poorly controlled diabetes;
- patients taking bisphosphonates;
- smoking more than 15 cigarettes/day;
- radiation therapy of head and neck within 5 years;
- parafunctional habits (bruxism, clenching);
- inadequate bone volume;
- inability to maintain the obligation to implant treatment and maintenance;
- inability or reluctance to provide informed consent;
- depression, psychiatric problems or unrealistic expectations;
- drug abusers;
- active infection/severe inflammation in the area intended for implant placement;
- participation in other trials, if the present protocol could not be properly followed.

Patients with age between 45 and 60 years were scheduled in younger group (YG), while patients with age equal or more than 75 years were included in older group (OG). All diagnoses were made clinically and radiographically. Written informed consent for immediate implant loading was obtained from all patients prior to the beginning of the study and the local ethical committee approved the study; professional oral hygiene was provided before surgery. Conventional impressions were taken for study models and temporary prostheses; to assess bone volume (according to Cawood and Howell classification (19)) and bone density (according to Lekholm and Zarb classification (20)) in each patient, the diagnosis was conducted as first level with orthopantomography and at second level with CBCT.

Surgical Procedure

All surgeries were performed by a single experienced surgeon (PC). On the day of surgery, implants were positioned after antibiotic prophylaxis with 2 g amoxicillin and clavulanic acid (Augmentin, GlaxoSmithKline, Belgium), which was administered 1 hour prior to surgical incision. Implant surgery was performed under local anaesthesia (optocaine 20 mg/ml with adrenaline 1:80000, Molteni Dental, Firenze, Italy). In maxillae, a crestal incision was performed on the alveolar crest from the pterygomaxillary region to the contralateral side with bilateral releasing incisions; a mucoperiosteal buccal flap was elevated, exposing the vestibular bony wall. Before implant insertion, all compromised teeth with a poor prognosis were extracted, and the sockets were carefully debrided and cleaned to minimise infection.

The two posterior implants (TTx, Winsix, Biosafin, Ancona, Italy) were placed following the anterior sinus wall, the implants were distally tilted at approximately 25–30 degrees relative to the occlusal plane, emerging at the second premolar position to shorten the cantilever length and maintain a large inter-implant distance. The two anterior implants always followed the jaw anatomy in direction.

The diameter of the final drill was chosen based on bone quality to optimise implant stability. The insertion of the implants followed standard procedures (Winsix, Biosafin, Ancona, Italy), although under-preparation was used in soft bone to achieve an insertion torque ranging between 30 and 40 N·cm before final seating of the implant, thereby obtaining high primary stability and immediate function. A manual wrench was also used when incomplete seating of the implant occurred. The implant neck was aimed to be positioned at bone level, and bicortical anchorage was established whenever possible.

Surgical placement of the implants always aimed to achieve ideal prosthetically driven implant positioning; therefore, to allow optimal prosthetic screw access and placement of holes in an occlusal or lingual location, angulated abutments (Extreme Abutment, EA® Winsix, Biosafin) for anterior implants were set at 17 degrees, and those for posterior implants were set at 30 degrees to compensate for the lack of parallelism between implants. Flap adaptation and suturing were performed with 4–0 non-resorbable suture (Vicryl; Ethicon, Johnson & Johnson, New Brunswick, NJ, USA). After surgery, mouth rinsing with a chlorhexidine digluconate-containing solution (0.12% or 0.2%),

twice a day for 10 days, was prescribed in addition to the recommended standard post-surgical medication: amoxicillin and clavulanic acid (Augmentin, GlaxoSmithKline) 1 g, twice a day for 7 days after surgery and non-steroidal anti-inflammatory drugs (Brufen 600 mg, Abbott Laboratories, Chicago, IL, USA) as needed. All patients were instructed to avoid brushing and any trauma to the surgical site and were recommended to follow a soft diet (avoiding bread and meat) for 2 months. One week after implant placement, sutures were removed (21, 22).
After surgery, a low-level laser therapy protocol was performed with a 645 nm diode laser to reduce inflammation of the tissues and to improve the healing phase of the tissues (diode laser, 645 nm, 0, 6 Watt) (EGG Laser, DMT, Lissone, Italy) (23).

Prosthetic Protocol

Within 24 hours after surgery, provisional full-arch all-acrylic resin prostheses were delivered in all patients based on preliminary impressions. Pickup impressions (Permadyne, ESPE, Seefeld, Germany) of the implants were made at the end of the surgery (after suturing) to enable manufacture of a high-density baked all-acrylic prosthesis with titanium cylinders. No more than 3 hours after the surgery, a screw-retained, metal-reinforced, acrylic provisional prosthesis with 10 teeth was delivered: indeed, no cantilevers were used in the provisional prostheses. The torque for tightening the prosthetic screws was 20 N. Screw access holes were covered with provisional resin (Fermit, Ivoclar Vivadent, Naturno, Bolzano, Italy). The acrylic resin implant-supported definitive prostheses with a titanium framework, were delivered 4 months after surgery. In the final prosthesis, the occlusion reproduced the natural dentition with distal cantilevers till first molar. The pontic areas had an ovate design and the prosthesis provided an intimate contact with the underlying soft tissues but with the cleaning space necessary for the domiciliar oral hygiene. Articulating paper (Bausch, Nashua, NH, USA) was used to check the occlusion and adjust it, if necessary. Static occlusion consisted of central contacts established on all masticatory units. Dynamic occlusion included canine/premolar guidance, regardless of the opposite arch settings. The screw access holes were covered with acrylic resin (Fermit, Ivoclar Vivadent Naturno, Bolzano, Italy).

Follow-up

Follow-up visits were performed at 3 and 6 months, then yearly until the 6-year follow-up after implant placement; every 6 months after implant placement, a dental hygienist performed oral hygiene procedures and recorded clinical parameters, including BI, plaque index, and probing depth around implants. Patients occasionally failed to visit the hygienist, but were always recalled for another appointment.

Outcome Measures

The outcomes considered were as follows:
1. Prosthesis failure: when prosthesis has to be replaced due to implant failure.
2. Implants failure: implant removal dictated by mobility, progressive marginal bone loss due to peri-implantitis, any mechanical complication rendering the implant not usable (e.g., implant fracture). The stability of each individual implants was assessed manually 6 months and then yearly from insertion by tightening the abutment screws with the removed prostheses.
3. Biological and prosthetic complications (number and type) were recorded as single episodes for each implant. Particular attention was used to assess peri-implantitis (defined as progressive bone loss with sign of infections around an osseointegrated implant), presence of pain, presence of pus, paresthesia in the lower jaw, implant fracture.
4. Peri-implant marginal bone level changes (MBLCs): Radiographic assessments were made using periapical radiographs obtained immediately after surgery and at each follow-up visit. Bone level measurements were performed on the mesial and distal aspects of each implant using the implant–abutment junction as a reference point; they were made perpendicular to the long axis of the implant with the long-cone parallel technique using an occlusal custom template to measure the MBL. A dedicated dentist measured the changes in crestal bone height over time. The difference in bone level was measured radiographically through custom software (DIGORA 2.5, Soredex, Tuusula, Finland). The software was calibrated for each image using the known implant diameter at the most coronal portion of the neck of the implant. The linear distance between the most coronal point of bone-to-implant contact and the coronal margin of the implant collar was measured to the nearest 0.01 mm at both the mesial and distal sides, and then averaged. Marginal bone loss was calculated as the difference in peri-implant bone level between the first (immediately after fixture placement) and last (during the recall visits) radiographs, and the change in crestal bone height was measured over time. Bone level changes at single implants were averaged at the patient level.

Statistical Analysis

For statistical analyses, SPSS software (version 11.5.0, SPSS, Chicago, IL, USA) was employed to ensure standardized and data processing. Data were analyzed at the patient level, with results expressed as mean ± standard deviation (SD) to account for the distribution and variability within the sample. Critical implant

MAXILLA n=216				
		length 13 mm	length 15 mm	lenght 11 mm
UPRIGHT n=108	diameter 3.3 mm	45	0	12
	diameter 3.8 mm	37	0	14
TILTED n=108	diameter 3.3 mm	15	28	0
	diameter 3.8 mm	16	49	0

Tab 1. Implants dimensions and position.

parameters, including fixture height, diameter, and insertion site, were meticulously documented for all patients to allow a detailed evaluation of procedural outcomes. Outcome variables were assessed in terms of implant failures, prosthetic failures, peri-implantitis incidence, episodes of suppuration (pus), pain, paraesthesia, and fixture fractures. These parameters were reported as absolute values and/or percentages, providing a comprehensive understanding of the complication rates across the entire cohort. This allowed for a robust comparison of the clinical performance and complication profiles between the younger and older patient groups. To assess differences in marginal bone levels between younger and older patients, Student's t-tests were performed at 6 months postoperatively and at yearly intervals up to the 6-year follow-up period. This statistical approach was selected due to its ability to compare mean values between two independent samples (younger vs. older patients). The analysis was conducted at a significance level of $p < 0.05$, indicating that observed differences would need to have a probability of less than 5% of occurring by chance to be deemed statistically significant. This ensures a correct interpretation of results, minimizing the risk of Type I errors and reinforcing the reliability of the study's conclusions regarding implant success and associated outcomes.

RESULTS

From November 2010 to April 2013, 78 patients with age between 45 and 60 years and age equal or more than 75 years, needing maxillary full-arch rehabilitations, were screened at the Department of Dentistry, IRCCS San Raffaele Hospital, Milan, Italy. Among them, 54 patients met the eligibility criteria and were included in the study; they underwent treatment from November 2010 to May 2013. Twenty-seven patients were allocated in YG, while 27 patients were included in OG. Among them, 7 patients (12.96%) were smokers, 6 in YG (22.22%) and 1 in OG (3.70%). According to the "all-on-four" protocol, a total of 216 implants were placed in 54 patients (table 1) and, in total, 54 "all-on-four" rehabilitations were delivered. In YG, 12 patients out of 27 were affected by controlled systemic diseases, while in OG 25 out of 27 patients were affected by controlled systemic diseases (table 2). Moreover, in YG one patient was affected by two systemic diseases (hypertension and osteoporosis), while in OG 13 patients were affected by two systemic diseases (Table 2). In OG, 3 drop-out occurred: 1 patient died for heart failure at 5 years from immediate loading, 1 patient died for lung cancer at 4 years and 3 months from immediate loading, and 1 patient developed severe cognitive impairment and underwent institutionalization in a foreign city at 3 years and 7 months from immediate loading.

DISEASE	# patients YG	# patients OG
Hypertension	7	21
Diabetes	4	9
Osteoporosis	1	5
Heart failure	1	3

Tab 2 . Systemic disease for group.

Implant Failure

Implant failure was registered in four patients (4 of 216 fixtures) (table 3); 2 implants were lost in YG

# patient	Group	Position	Reason	Timing	Smoker	Systemic diseases
1	YG	left mesial	primary infection	1 month	Yes	osteoporosis
2	OG	left mesial	primary infection	1 month	No	Hypertension
3	OG	left distal	primary infection	2 months	No	Hypertension and heart failure
4	YG	right mesial	Perimplantitis	3 ys and 2 months	No	diabetes

Tab 3. Details of implant failures.

Bone Loss	YG	OG
6 months (mm)	0.58 ± 0.47	0.60 ± 0.45
1 year (mm)	0.72 ± 0.45	0.69 ± 0.61
2 years (mm)	0.73 ± 0.69	0.80 ± 0.51
3 years (mm)	0.80 ± 0.91	0.83 ± 0.55
4 years (mm)	0.79 ± 0.95	0.84 ± 0.67
5 years (mm)	0.83 ± 1.00	0.96 ± 1.01
6 years (mm)	0.85 ± 1.04	1.01 ± 0.93

Tab 4. Marginal bone loss for younger group (YG) and older group (OG).

	# complications	Rate
Implant failure	4	1.85%
Prosthetic failure	0	0
Fixture fracture	0	0
Perimplantitis	7	3.24%
Provisional prosthesis fracture	3	5.55%
Episode of Pus	0	0
Pain	0	0
Paresthesia	0	0

Tab 5. Implant failure, prosthetic failure, biological and mechanical complications.

and 2 implants in OG. Detail of lost implants were reported in table 3. So, an implant failure rate of 1.85% was reported in each group. In YG, 1 implant was lost for peri-implantitis at 3 years and 2 months from immediate loading and 1 implant was lost for primary infection at 1 month from immediate loading. In OG, 2 implants were lost for primary infection respectively at 1 month and 2 months from immediate loading. In YG,1 implant was lost in 1 smoker and 1 implant in a no smoker, while in OG, 2 implants were lost in no smokers. Moreover, all implants were lost in patients affected by systemic diseases: in YG, 1 implant was lost in a patient affected by diabetes and 1 implant in a patient affected by osteoporosis, while in OG, 2 implants were lost in patients affected by cardiological diseases. In each case, implants of the same length and larger diameter were replaced by changing the implant seat. No implant fracture occurred.

Biological and Prosthetic Complications

Peri-implantitis was observed in 7 of 216 implants (3.24%) and 4 of 54 patients (7.41%) (2 from YG and 2 from OG) at the 6-year follow-up. Fracture of provisional prostheses occurred in 3 patients and in 3 of 54 rehabilitations before the 6-month follow-up. 1 patient was from YG and 2 patients were from OG. No paraesthesia and no prosthetic complications in definitive prostheses were registered in any of the patients.

Peri-implant MBLs

MBL outcomes were reported in Table 4. Both axial and tilted implants showed good maintenance of bone levels in each YG and OG. At the 6-year radiographic evaluation, peri-implant crestal bone loss averaged 1.01 ± 0.93 mm for OG and 0.85 ± 1.04 mm for YG. No statistically significant differences in MBL between YG and OG were observed at each follow-up evaluation ($p > 0.05$).

Prosthetic Failure

Three of 54 fixed provisional prostheses were fractured during the observation period, representing a prosthetic survival rate of 94.45% (table 5). Among definitive prostheses, no failure was observed and no fracture of the acrylic resin superstructure occurred.

DISCUSSION

This study offers a valuable comparison of implant survival between younger and older patients, providing crucial insights for clinical practice, particularly concerning the all-on-four rehabilitation technique. The existing literature has predominantly focused on implant use in elderly patients for overdentures, single implants, or implants placed in the aesthetic zone. However, none have thoroughly explored immediate-loaded full-arch rehabilitation, despite its frequent application and strong endorsement within the scientific community (24). According to Malò's longitudinal study of 1070 patients over a 13-year follow-up period, the All-on-4 treatment concept has been consistently demonstrated to be both predictable and safe, with favorable long-term outcomes (25). Capparè and colleagues further substantiated these findings by examining 50 patients who received immediately loaded prostheses supported by six implants (totaling 300 implants), with an impressive fixture and prosthetic survival rate of 100% (26). This level of predictability and reliability has also been echoed by other researchers who assert that both cement- and screw-retained ceramic restorations are not only highly biocompatible but also offer superior esthetics in full-arch rehabilitation (27). Despite the breadth of these findings, our study's results indicated that there was no statistically significant difference between younger and older patients, as the implant failure rate remained at 1.85% in both

groups, reinforcing the notion that age may not be a primary factor influencing implant survival.
While these findings offer reassurance, the limitations of the current study should not be overlooked. A potential source of bias stems from one of the two patients experiencing implant failure being a smoker. Previous research has consistently demonstrated that smoking can significantly impair implant success rates, particularly concerning bone healing and osseointegration. As such, future investigations should aim to directly compare outcomes between smokers and non-smokers to better elucidate the influence of smoking on implant survival (28). Another limitation pertains to the challenges associated with tissue healing in elderly patients. As highlighted in Srinivasan's review, aging is associated with delayed bone healing, compromised osseointegration, and altered oral biofilm composition, which could negatively affect implant success (6). Meyer also attributed such complications to age-related declines in both visual and tactile perception, which in turn, leads to a deterioration in oral hygiene practices. Older individuals may brush their teeth less effectively and less frequently, prioritizing oral hygiene to a lesser extent than their younger counterparts (29). Consequently, these factors may indirectly contribute to the increased risks observed in implant failure among elderly patients.
Nevertheless, it is crucial to recognize that age alone may not be the sole determining factor. Muller et al. postulated that personal hygiene, rather than chronological age, plays a more critical role in implant outcomes. They suggested that implant rehabilitation should be limited to patients with good oral hygiene habits and the absence of detrimental behaviors, such as smoking or poor oral care routines, regardless of their age (30). This nuanced perspective shifts the focus away from age as a limiting factor and instead emphasizes the importance of maintaining proper oral hygiene to ensure successful implant outcomes. In this regard, clinicians must carefully assess patients' hygiene status and provide rigorous oral hygiene education, particularly for older individuals who may experience a decline in physical or cognitive abilities that could impede their ability to maintain adequate oral care. The non-linear risk pattern of implant failure identified in Jemt's recent study offers further insight into the complexity of these outcomes. Interestingly, Jemt found that middle-aged patients, rather than the elderly or younger individuals, exhibited a higher risk of implant failure. This finding raises important questions about the underlying reasons for this increased risk, which Jemt hypothesized might be related to partial edentulousness, particularly in patients classified as Cawood and Howell classes I and II (31). The presence of partial edentulism could introduce additional biomechanical challenges, such as uneven loading or compromised support, which may contribute to higher failure rates. It is worth investigating whether these patients could benefit from alternative implant designs or placement strategies to mitigate these risks.
Kower's study, on the other hand, highlighted the comparable clinical and radiographic outcomes between elderly patients treated for partial edentulism and those undergoing treatment in fully edentulous jaws (32). These findings further challenge the notion that age is a primary determinant of implant success, suggesting instead that patient-specific factors such as oral hygiene, bone quality, and soft tissue health may play a more significant role in determining outcomes. Based on our findings and the wider body of literature, we propose that age should be considered a secondary variable when evaluating patients for full-arch rehabilitations. Instead, greater emphasis should be placed on the patients' oral hygiene practices and the presence of any harmful habits, such as smoking or neglecting oral care routines.

CONCLUSION

In conclusion, while age is often perceived as a barrier to successful implant rehabilitation, particularly in full-arch cases, the evidence suggests that it may be a less significant factor than previously thought. Our study supports the hypothesis that implant success is more closely tied to individual hygiene practices and the absence of detrimental habits, rather than chronological age. Moving forward, clinical decision-making should prioritize these factors to enhance outcomes, particularly in older patients who may present with additional comorbidities or functional limitations. Future research should continue to explore these relationships, with a focus on developing tailored interventions that address the specific needs of different age groups, while also taking into consideration their overall health status, bone quality, and adherence to oral hygiene protocols. This approach will ensure that implant rehabilitation remains a viable and successful treatment option for patients across all age groups.
Within its limitations, the present study reported that immediate fixed maxillary full-arch rehabilitation is a suitable procedure in elderly people with equal or more than 75 years of age.

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