IMPLANT-SUPPORTED OVERDENTURES: CLINICAL REVIEW

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ABSTRACT
Aim: The aim of this literature review is to evaluate the various studies and systemic reviews conducted on maxillary and mandibular implant-supported overdentures.

Background: Conventional complete dentures were the common treatment modality for edentulous patients. However, the advent of implant-supported overdentures has replaced conventional dentures as a better standard for rehabilitation.

Review results: Mandibular implant-supported overdentures have a higher success rate than maxillary implant-supported overdentures. Maxillary implant-supported overdentures tend to be a form of “rescue treatment,” than being the first modality of treatment for edentulous patients.

Conclusion: To improve the success rate of implant-supported overdentures, careful case selection is an important criterion. Further research needs to be conducted to improve the success for maxillary implant-supported overdentures.

KEY WORDS: Review, overdenture, implant, retention

INTRODUCTION
Edentulism is considered a poor health outcome and may compromise quality of life. The prosthetic management of the edentulous patient has long been a major challenge for dentistry. The classical treatment plan for the edentulous patient is the conventional complete removable maxillary and mandibular denture. However, this treatment has several drawbacks specially that of the lower denture. Treatment of edentulous patients with implant-retained removable prostheses has been shown to provide a predictable and successful outcome that overcomes the functional deficiencies that are associated with conventional dentures. Recently the most basic restoration for the edentulous mandible should be an implant retained overdenture with two implants placed in the anterior mandible. In completely edentulous patients, implants can be used in conjunction with attachments to enhance the retention and stability of the overdentures. Different types of attachment systems had been suggested for retaining implant supported overdentures including stud (ball and socket, locator), bar, telescopic and magnetic attachments. All these types of anchorage systems had different retentive capacities. Thus, the present study is designed to compare the retention of two different implants attachments. The factors that adversely affect successful use of a complete denture on the mandible include: mobility of the floor of the mouth, thin mucosa lining the alveolar ridge, reduced support area and the motion of the mandible. Edentulous patients with severely resorbed mandible often experience problems with their conventional complete denture, especially with regard to mandibular denture. These problems include: difficulty with prosthesis retention, stability and comfort. This in turn may negatively affect functional ability such as speech, aesthetic and mastication.

The edentulous patients with a severely resorbed mandible often encounter problems with their mandibular complete dentures. The main complaints of these patients are lack of optimal stability and retention of their mandibular dentures, together with decreased chewing ability.

The problems of conventional complete dentures can be summarized as continued alveolar bone loss leading to...
lack of stability and retention especially of the lower denture which in turn causes lack of self-confidence and reduction in biting force and chewing efficiency, so most difficulty with complete denture prostheses arises from the inability to function with the mandibular prostheses.\(^8\)$\(^9\)

Fig.2

The aim of this literature review is to evaluate the various studies and systemic reviews conducted on maxillary and mandibular implant-supported overdentures.

**Implant-supported Overdenture**

Dental implant is a prosthetic device made of alloplastic material(s) implanted into the oral tissues beneath the mucosal or/and periosteal layer, and on or within the bone to provide retention and support for a fixed or removable dental prosthesis; a substance that is placed into or/and upon the jaw bone to support a fixed or removable dental. There are many classification that are related to dental implant including types of implant, material of implant, time of implantation and others. However, the classification of implants according to the time of loading is relevant in this review. Overdentures improve phonetics patient psychological outlook and quality of life.

Conventional dentures rely upon residual alveolar ridge and mucosa for support and retention. Patient finds implant supported overdenture significantly more stable and rate their ability to chew a wide variety of food as significantly easier, this improves the nutrition state of soft-tissue cover age and extension of the prosthesis which is especially important for new dentures or those who have low gagging thresholds, less bone resorption, greater prosthesis stability, better esthetic, improved maintenance. The effect of tooth loss is two-fold which may affect the patients psychologically and clinically.\(^10\)

Fig.3

Clinically, the effects of tooth loss are important. Alveolar bone resorption could be considered condition and can pose a prosthodontic dilemma for the restoration of edentulous mandible. Tallegren reported that mean decrease in anterior mandibular ridge height was four times greater than that of the maxilla. Alveolar bone loss can be reduced by provision of implants, studies have shown that implant supported mandibular over dentures can preserve bone height in areas where implants are located.\(^11\)$\(^Fig.4\)

Psychologically, edentulism has been quoted as having characteristic of a chronic illness as it is incurable and functionally and physiologically disruptive. Reduced self confidence, taboo and the feeling of premature ageing have been also been reported by patients.\(^12\)

According to time of loading Implants can be classified into: Delayed implant loading and immediate implant loading;

**A-Delayed Implant Loading:**

Conventional implant treatment protocols involved the placement of implants followed by a healing period of three to six months in a submerged or nonsubmerged placement. These periods were necessary to allow for complete osteogenesis and woven bone remodeling into load-bearing lamellar bone prior to any occlusal loading.\(^13\)

The disadvantages of delayed implant loading is the need to remove the conventional denture for two weeks after implant placement to promote healing in addition to postoperative changes in the soft tissues during the healing period can result in discomfort and often necessitates frequent prosthesis adjustment. Moreover, additional surgery to expose the implant fixtures is another disadvantage of the delayed loading protocol. These concerns have commonly caused physiological, psychological or sociological challenges for patient who underwent implant treatment.\(^14\)$\(^Fig.5\)

**B – Immediate implant loading:**

Implant placement and prosthetic loading for edentulous patients at the same clinical visit or separated by two to four weeks was proposed.\(^15\) This approach was primarily applied in the mandible where excellent primary implant stability can be achieved in the interforaminal region.\(^16\)

Bone formation has been shown to be enhanced by adequate mechanical stimulation. Initially, the attachment of the implant to the bone is purely mechanical (primary stability) this, primary stability depends on the implant (dimension and design) and the implant bed (bone density). Over the course of bone healing, both mechanical and biological factors are important in implant anchorage (secondary stability).\(^17\)

Several timings have been proposed for immediate implant loading some authors reported that, the implants should be functionally loaded by the prosthesis within 72 hours following implant placement.\(^18\) Others report loading within 48 hours, 24 hours or at the same visit following implant placement. However, suggested that immediate loading up to one week following implant placement was acceptable.\(^19\)

Many authors discussed that there is no significant difference in the clinical and radiographic state of patients treated with implant supported mandibular overdentures loaded either 1 week or 3 months after surgery.\(^20\)

The results of 1-year study of the mandibular overdenture treatment using single-stage surgery and immediate prosthetic loading of implant indicated that immediate loading to retain a mucosa-borne overdenture is a safe, reliable, and cost-effective treatment.\(^21\)

In concrescence mentioned that the immediate loading of two implants by means of ball attachment-retained mandibular denture is a predictable treatment option that offers increased stability and comfort, while keeping a high implant success rate.\(^22\)

**Advantages of immediate loading**

The advantages of immediate loading are numerous; the positive effect on bone response; reduced numbers of visit, monitoring implants during healing and cost effectiveness are viewed here.

One-stage implant treatment, by the use of either nonsubmerged implants or modified two-stage submerged treatment using a one-stage surgical protocol, has recently become more popular. The placement of implants in a one-stage procedure has some advantages; only one surgical
intervention is needed, treatment time is shorter, costs are lower, and clinical monitoring of the implants is possible during the osseointegration period.

Immediate occlusal loading provides many advantages where the implant and prosthesis are placed in the same day, thereby providing the patient with an esthetic and stable replacement for the missing tooth/teeth in one appointment. Moreover, the use of the immediate loading concept significantly reduces the total treatment period which has positive social and psychological effects for the patient and increase significantly the patient comfort.\textsuperscript{23} During the osseointegration period, the implants are accessible for clinical monitoring added that immediate loading of implants would not only reduce the risk of development of fibrous tissues, but also minimize the development of immature bone and promote a faster maturation of the immature bone to lamellar bone by accelerating bone remodeling at the bone/implant interface by inducing bone cells stimulation.\textsuperscript{24}

Immediate loading within physiologic limits stimulates bone formation as result of the bone adaptation to loading.

The benefits of an immediately loaded implant-supported prosthesis in edentulous patients reduce surgical and prosthetic visits along with improved function and patient comfort in addition functional prosthesis delivered immediately after surgery.

Immediate loading eliminates the need for numerous and long appointments that may require great demands on practitioner time for adjustment of provisional prostheses delivered to the patients during the healing period of delayed loaded implants.\textsuperscript{25}

Disadvantages of immediate loading

This approach cannot be applied to every implant patient. In comparison to conventional implant therapy, the immediate occlusal loading procedure requires more chair time at the time of implant placement for both the patient and the restorative practitioner. Immediate loading also requires effective communication and coordination among the surgical and restorative teams, as there is a degree of flexibility involved in the delivery of the prosthesis.\textsuperscript{26}

The main disadvantage of this technique is the risk of implant failure with subsequent multiple appointments to remove the implant, graft bone and replace a new fixture. In this case, the second implantation does not follow the immediate loading protocol. As well as, the immediate loading technique in completely edentulous patients...
requires usually many implants which increases the fee and makes patient’s acceptance less likely.

**Indications**

- Severe morphologic compromise of denture supporting areas that significantly undermine denture retention
- Poor oral muscular coordination
- Low tolerance of mucosal tissues • Para functional habits leading to recurrent soreness and instability of prosthesis • Unrealistic prosthodontic expectations
- Active or hyperactive gag reflexes, elicited by a removable prosthesis, e.g. roofless maxillary denture
- Psychological inability to wear a removable prosthesis, even if adequate denture retention or stability is present
- Unfavorable number and location of potential abutments in residual dentition. Adjunctive location of optimally placed osseointegrated root analogs would allow for provision of a fixed prosthesis.

**Contraindications**

- Chemical dependency (like phenytoin)
- Uncontrolled systemic disorders
- Psychological (schizophrenia, dysmorphophobia).

Treatment modalities for the restoration of edentulous mandible include: mandibular complete denture preprosthetic surgery with mandibular complete dentures and implant supported mandible overdentures and implant supported fixed bridge. Classic treatment for the edentulous mandible is a mandibular complete denture; the pattern of bone loss associated with the complete dentures can result in dentures bearing area becoming compromised. Redford demonstrated that more than 50% of CD wearers have problems with the retention and stability of these mandibular complete dentures. When the patient experiences poor retention and stability, patient satisfaction, confidence and comfort will suffer. The implant-supported mandibular overdentures have been investigated by Van Steerbergh being one of first authors to purpose the placement of two implants in mandible to support an overdenture. Within 52 months, a 98% success rate was achieved. Implant supported overdenture requires frequent maintenance, especially during their first year.26 Atterd et al concluded that cumulative survival rate of over dentures was 100% at 15 years with longevity of prosthesis being 10.39 ± 5.59 years. Albrektsson et al have argued that state of almost ‘restitution and integrum’, can be achieved with dental implants.27

**Selecting an adequate ISO attachment**

Clinicians have selected different attachment systems based on factors such as durability, patient demand, cost effectiveness, technical simplicity, and retention. Attachments can be classified depending on its function as a) rigid, if they do not allow any denture dislodgements, or b) resilient, when they allow translation, rotation, axial or hinge over posterior axes movements or a combination of them because of their flexibility. With rigid attachments, the implant will receive 100% of occlusal load, whilst, with resilient attachments, occlusal load will be supported by implant, denture or fibromucous. Currently, the most used attachments are:

- **“O” Ring or Ball attachment**
  Ball attachment is considered the simplest type of attachment for clinical application with tooth or implant supported overdentures. It has a screw-retained male abutment in the implant with a spherical shape on its occlusal portion, and a prosthetic anchored female part that can be metallic or covered with nylon having a different retention range. These attachments do not need a great prosthetic space and they allow hinge and rotation dislodgements. However, the specific design of the ball attachment may influence the amount of free movement thereby limiting its resiliency. However, these attachments cannot be used with non-parallel implants.28

- **Magnetic attachment**
  Basically, they consist of one magnet attached to the denture and another to the implant. They constitute a simple and comfortable system for the patient as magnet attraction guides the denture insertion. On the other hand, they have a weaker lateral stability and retention in comparison with mechanic attachments as ball or bar devices. In addition, they are susceptible to corrosion by saliva, explaining why they are clinically less often used.29 However, a new generation of rare-earth magnetic attachments could improve their properties and be clinically more often utilized. These new attachments may still be a useful treatment option for edentulous patient with weak muscle disease such as Parkinson’s disease patients, because they not only keep the denture stable, but also need less force to insert and remove the denture.30

**Bar attachments.**

Bar constitute an excellent anchorage system that provides greater retention, enabling better force balance by its splinting effect and it can also correct severe unparalellisms. The retention elements or clips are interchangeable and can be reactivated. The main disadvantages of bar attachments are the need for a large prosthetic space and the risk of mucositis due to an inadequate oral hygiene under the bar. Bars need to be parallel to the rotation axis, be straight and be positioned 1-2 mm to the alveolar crest. There are some different bar designs as Ackermann Bar (spherical shape), Dolder Bar (ovoid or “U” shape) and Hader Bar (keyhole shape). Also, there are implant-supported milled bars overdentures. They are bars with precision attachments and rigid anchorage, made by casting, electroerosion or CAD/CAM. They need a larger prosthetic space because of its volume and necessitate a good implant anchorage to support functional forces. They have double retention: by wall convergence of two degrees and by using other attachments systems anchored to the bar as Locator or ball attachments it will be indicated that the implant be splinted with bar attachments. According to Adell et al. improve the success rate of implant-supported overdentures, careful case selection is an important criteria. Further research needs to be conducted to improve the success for maxillary implant-supported overdentures. Clinical Significance: Implant-supported...
overdentures have improved the masticatory efficiency and the quality of life of patients. Therefore, this treatment modality should be considered as a primary treatment option for edentulousness in future, there were more failures (24%) in implants less than 10 mm long. Depending on implant location if implants are placed quite far from each other, it will not be indicated to use bar attachments due to increase of bone stress.

- Locator attachments
The male part consists of an implant screw-metallic abutment and the female part of a metallic cap lined with nylon of different colors depending on their retention capacity, which is anchored to the denture. There are two types of nylon: a) those with internal and external retention for well-positioned implants (from more to less retention: transparent, pink, blue) and b) with external retention for parallel implants (from more to less retention: green, orange, red). Finally, there is a yellow nylon for laboratory use that can also be used as temporary nylon. These attachments do not need a large prosthetic space and they can correct unparallelism up to 40 degrees. The attachments allow for rotation dislodgement and their utilization is widely endorsed in the current literature.

- Telescopic attachment
Telescop ic crowns are also known as a double crown, crown, and sleeve coping. These crowns consist of an inner or primary telescopic coping, permanently cemented to an abutment, and a congruent detachable outer or secondary telescopic crown, rigidly connected to a detachable prosthesis. The use of telescopic retainers has been expanded to include implant retained prostheses to make use of their enormous advantages. These retainers provide excellent retention resulting from frictional fit between the crown and the sleeve. They also provide better force distribution due to the circumferential relation of the outer crown to the abutment which makes the axial transfer of occlusal load that produce a less rotational torque on the abutment by improving the crown root ratio so preserving the tooth and alveolar bone. According to wall design telescopic retainers can be classified into parallel sided crowns, tapered (conical-shaped) crowns, and crowns with additional attachments. Telescopic retained restoration has the advantage of the ease of removability. This encourages the patient for repeated cleaning and maintenance purposes. Moreover, the overdentures self finding mechanism in telescopic constructions facilitated prosthesis insertion considerably. This construction seemed to be an effective treatment modality for geriatric patients with serious systemic diseases as in Parkinson’s diseases.

Peri-implant findings and prosthetic complications
Peri-implant tissue evaluation criteria vary between studies. Evaluation often includes plaque index, bleeding index, probing depth, amount of keratinized attached mucosa and marginal bone level, and possible exudation of peri-implant pockets is recorded if seen. There are varying opinions regarding the importance to and impact on peri-implant health of a zone of keratinized attached mucosa surrounding dental implants. It has been reported that healthy marginal mucosa around implants could be achieved in good oral hygiene conditions also in situations when no keratinized mucosa is present. Complications seen with implant overdentures are usually biological and technical or mechanical and more mucosal hyperplasia has been noticed with bars than with ball attachments. It has been supposed that an insufficient space beneath the bar—which prevents proper cleaning—may cause a soft-tissue inflammatory response under the bar attachment. Another reason for mucosal hyperplasia with bars could be the less precise settling of the denture base to the mucosa compared with ball overdentures. Perimplant mucositis is rather often seen around implants. The incidence (an average of 19 %) associated with implant overdentures is greater than with fixed implants. It has been found that peri-implant tissue health is not related to the retention system used. The most common technical complications with implant overdentures are loosening of the retentive mechanism, usually seen in about 30 % of cases. In addition, fracture of the retentive anchor, occlusal screw loosening with bars, fracture of the acrylic base material or broken teeth and fractured bars are common findings. Resilient attachments were observed to more frequently have broken, loose, or lost female parts and a need for repairs and relining of the denture base, whereas rigid bar attachments more typical need tightening of the bar retainers.

It has been shown that attachments wear over time and lose their retention force. Several studies have been published concerning the need for corrections and adjustments of overdentures after delivery of the prostheses. Prosthetic maintenance is needed with all attachments, but barsupported overdentures have been observed to need it less. A rigid milled bar attachment on four-implant overdentures has been shown to cause less prosthetic maintenance compared with resilient denture attachments with ovoid bars. On the other hand, Gotfredsen and Holm (2000) presented that the frequency of technical complications was higher with bars than with ball attachments with two implants and an overdenture. Recent studies conclude, however, that there is no correlation between attachments and prosthetic complications. Only bars with distal extensions have been seen to have more. Maxillary overdentures have been found to have more prosthetic complications than mandibular overdentures, but the surveys vary.

DISCUSSION
Implant-supported and -retained overdentures have become a widespread and predictable treatment option for edentulous mandibles. Comparatively low costs and simple treatment compared with fixed structures, easiness of hygiene and sometimes also better esthetic results when lost hard and soft tissues need to be replaced are factors that account for the success. A sufficient amount of bone is usually available in the interforaminal area of the mandible to enable implantation. The number of implants needed for a mandibular overdenture is smaller than for a
fixed implant bridge—usually two to four implants—and this is advantageous when the amount of jawbone is reduced. Numerous studies confirm good treatment results with two mandibular implants also in the long term. It is generally stated that for an edentulous mandible, two-implant overdenture treatment should be the standard of care relative to conventional denture treatment. Marx et al presented a technique in 2002 in which dental implants were used as “tent poles” in combination with bone grafts to maintain the bone volume. This surgical procedure uses autogenous bone grafts from the iliac crest and implantation is performed extraorally underneath the tip of the mandible at the chin during the same operation. This technique has been called soft tissue matrix expansion and has also been used as a modified technique in Oulu University Hospital.

This treatment modality was developed primarily for cases with extreme alveolar resorption of the mandibular bone, with typically approximately six mm or even less of ridge height left, and has helped alleviate severe problems with conventional complete dentures. During the past decades several different attachment systems have been presented and compared with each other in terms of retentive force, easiness to use and hygiene, tendency to breakage and economic factors. It has been noted that when the attachment system or the number of implants is varied, there is no clear differences in satisfaction among patients with mandibular overdentures.

Cordioli G et al in 1997, conducted a five-year study which evaluated a treatment option by using a single implant over denture in the midline of the mandible of 21 geriatric patients according to the protocols of standard surgical technique in two stages. Improvement in oral comfort, function and health of the peri-implant soft tissues, and the marginal bone levels interproximally were evaluated for 5 years after over denture delivery. Results showed a remarkable improvement in comfort and function without any failures of the implants placed.

Krennmaier G et al in 2001 nine patients with a mean age of 82.2 years underwent placement of a single symphyseal endosseous implant and anchorage of complete denture using ball attachments. Standardized recall examinations were carried out at intervals of 3-6 months for a period of 18 months. The anchorage with single implant led to the improvement of both patients’ subjective satisfaction and reduction in reported discomforts.

Wolfart S et al in 2008 reported two clinical cases of a single implant in the middle of the mandible with ball attachment and with a screw activated matrix for the stability and retention of the prosthesis. The result showed improvement in the chewing ability and quality of life in old patients.

Walton JN et al in 2009 conducted randomized clinical trial of 86 subjects using conventional complete dentures were given either one midline or two bilateral mandibular implants. Patient satisfaction was similar and the single-implant patients had the benefit of significantly lower component costs, reduced time of surgery, postsurgical maintenance and besides in the 2 implant group five implants had failed in four patients.

Liu J et al. In 2013 conducted a study on the influence of number of implants on the biomechanical behaviour of mandibular implant retained over dentures and concluded that, Single implant retained over dentures showed no damaging strain concentration in the bone surrounding the implant.

Grageda E et al in 2014 published a report that single implant retained over denture had an additional advantage which was less expensive and invasive compared to that of the over dentures supported by two implants.

Bryant SR et al. In 2015 compared use of single or two implants for implant over dentures in a five year randomized clinical trial. It showed no significant difference in the satisfaction or survival of edentulous subjects.

Alsabeeha N et al. In 2010 did an in vitro retention force investigation on different designs of attachment systems used for single-implant retained mandibular over dentures. Here, two ball attachments (prototype) of greater dimension and four commercially available attachments (ball and stud) of normal dimension were compared. They found that attachment systems of larger dimensions provided higher retentive forces for mandibular single implant over dentures. Alsabeeha NH et al. in 2010 did a study on the clinical performance and material properties of single-implant over denture attachment systems and concluded that large ball attachment systems reflected favourable wear behaviour and clinical performance.

Cheng T et al in 2012 conducted a study on patient satisfaction and masticatory efficiency of mandibular over dentures retained with single implant using the attachments (stud and magnets) and found that there were no statistically significant differences in overall patient satisfaction, speech, and retention between the above mentioned attachments.

Kono K et al in 2014 conducted a study on in-vitro assessment of mandibular single/two implant over dentures using stress-breaking ball attachments and conventional ball attachment. Strain surrounding the implant, pressure at 5 different soft tissue areas, and displacement of the denture base were measured and found that the pressure at each region of the stress breaker ball attachment was less than that compared with the conventional ball and it also provided optimal stress distribution.

Nascimento JF et al. In 2015 conducted a study on the photo elastic stress distribution produced by different retention systems for a single-implant mandibular over denture in photo elastic model of a resilient edentulous ridge. They concluded that the load transmitted to the implant was equally distributed over the implant with low stress concentration.

Maeda Y et al conducted an in-vitro study and came to an conclusion that over dentures using single implant with dome-type magnet or ball attachments had biomechanical effects similar to the two-implant over dentures in terms

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of lateral forces transmitted to the abutment and denture base movements under molar functional loads.60

Liu J et al. conducted a three-dimensional finite element analysis on the influence of number of implant on the biomechanical behaviour of periimplant bone, implants, abutments and over dentures and were recorded. They concluded that single implant retained mandibular overdentures do not show damaging strain concentration in the bone around the only implant and that it was a cost-effective treatment option for edentulous patients. The placement of a third implant between the original two in patients rehabilitated by two-implant overdentures showed improvement in the constant and obvious denture rotation around the fulcrum line showed.53

When selecting an attachment system the dentist must take into consideration the long term results. The selection criteria for the attachment system are the following:

1. The number, the position and the angulation of the implants. There can be used a minimum of two implants, unsplinted or splinted by bar. Thus, their number depends on the prosthetic factors, but also on the number of implants that must be. The choice of the attachment systems must take into consideration also the inclination of implants, ball attachments imposing a divergence of maximum 30 degree, and locator allowing up to 20 degree divergence on each implant, meaning a divergence of the long axis of implants of up to 40 degree. [10,26]

2. The prosthetic features: the vertical prosthetic space, the resilience of the oral mucosa, occlusal loading, the overdenture retention and stability requirements analysed in conjunction with patient’s anatomical and functional particularities.[1,2,5,26,31]

3. The manual dexterity of the patient influences his ability to properly manipulate the overdenture, as its insertion and removal. In patients with decreased manual dexterity, relatively frequently encountered in elderly, it is more appropriate to chose a less retentive attachment system[13,31].

4. Biological conditions and therapeutic expectations. Splinting the dental implants by choosing bar as attachment system provides a more uniform distribution of occlusal forces, but has the disadvantage of higher costs for addressing the complications – loss of one implant may be accompanied by the need of replacement of the entire bar system and also the prosthesis. [5,7,10,26,31]

5. Financial and time resources of the patient. The cost of fabrication of the bar attachments in contrast to stud abutments will be much higher in most instances. Treatment options should never solely be based on finances. [3]

Choosing the attachment systems for the implant overdentures must take into consideration long term results concerning retention, stability, mechanical complications, and selection criteria related to the number, inclination of implants, prosthodontic conditions, the dexterity of the patient, biological conditions, and therapeutic expectations, financial and time resources of the patients, overall costs and usage technique.

CONCLUSIONS

Mandibular implant-supported overdentures have a greater success rate than maxillary implant-supported overdentures. To improve patient quality of life, careful case selection should be incorporated for the success of both maxillary and mandibular implants supported overdentures. Further research needs to be conducted to improve the success for maxillary implant-supported overdentures.

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