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IMPLANT STABILITY IN RHEUMATOID ARHTRITIS PATIENTS REHABILITATED WITH IMPLANT SUPPORTED OVER DENTURES

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ABSTRACT

Aim: This study was performed to evaluate the implant stability in rheumatoid and non rheumatoid patients.

Materials and methods: Fourteen completely edentulous patients were selected for the study, seven of them were suffering from rheumatoid arthritis and the other seven were free from diseases affecting bone quality and quantity. All patients received two implants in the canine region. Then mandibular implant supported over dentures were constructed for all patients Implant stability was measured using Ostell on timing of implant placement, three months after implant placement and one month after loading the implants.

Results: There was statistically non significant change in implant stability for both rheumatoid and non rheumatoid patients through the whole follow up periods P=0.99.

Conclusion: Rheumatoid arthritis didn't affect the success of osseointegration.

KEY WORDS: Completely edentulous, Implant stability, implant overdenture, Rheumatoid Arthritis, osseointegration.

INTRODUCTION

Completely edentulous patients usually suffer from inadequate retention and stability of their removable conventional dentures. Nowadays dental implants are considered the most preferred treatment modality to provide adequate support and retention for restorations in completely edentulous patients.[1] Implant success requires good surface contact between the implant body and bone to permit proper and successful osseointegration. Elder people usually suffer from many chronic diseases that require lifetime treatment to maintain their health and quality of life. One of the common diseases that

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the elder patients suffer from is rheumatoid arthritis. Rheumatoid arthritis (RA) is an autoimmune disease of unknown cause but thought to be of genetic predisposition.[2] This disease in addition to other serious systemic conditions as osteomalacia and immune compromising conditions are considered by some clinicians as a risk for implant success rate.[3,4] This leads to the aggregation of immune cells within and around the synovial sac of the joints, therefore the joints become inflamed and deformed due to cartilage and bone destruction.[5,6] Usually RA is accompanied by osteoporosis due to increased systemic bone turnover and anti-inflammatory and/or combined anti-immune treatment regimens.[7,8] In patients with RA there were several factors that made the outcome after implant placement doubtful regarding implant success including the effect of prolonged use of corticosteroids for the suppression of the inflammatory effect of RA in addition to the bone quality itself.[9,10] Therefore are considered of high failure risk. The high failure risk was due to reduce bone formation and increase bone resorption.[11,12] Also they promote osteoblast apoptosis and favour the differentiation of bone marrow cells into adipocytes. Blood tests in RA patients showed an increase in non specific inflammatory mediators with elevation in the positive rheumatoid factors in 70% of patients.[13, 14] Symptoms of arthritis can affect the patient's capacity to perform the activities of daily living and their ability to perform their work. Concerning the dental work patients with RA may suffer difficulty in controlling their prostheses especially if the TMJ is affected by the disease and of course to the extent and severity of their conditions.[14,15]

MATERIALS AND METHODS:

Patients' selection: Fourteen completely edentulous patients were selected for this study. Seven of which were selected from the outpatient clinic, Removable prosthodontic department, Faculty of Dentistry, Cairo University. The other seven patients were selected from the outpatient clinic rheumatoid department, Faculty of Medicine, Cairo University.

Patients selected from the faculty of Dentistry were medically free from diseases that affects bone quality and quantity (NR) while those from the faculty of medicine were suffering from rheumatoid arthritis (RA) autoimmune disease Diagnosis of RA was based on the criteria of American Rheumatism Association(ARA).

Both Rheumatoid and non Rheumatoid patients were selected completely edentulous according to the following eligibility criteria:

- Age ranged from(40-55) years of age.
- Well to moderately developed ridges.
- Class I Angle's classification,
- Adequate salivary output.
- No signs of inflammation or severe bony undercuts or exostosis.
- Smokers were excluded from the study.
- For RA patients duration of their underlying disease ranged from (10-20) years. The study population was further examined to ensure isolated RA and absence of other autoimmune diseases as those affecting the soft tissue.
- Distribution of medical treatments regimens for the underlying disease was similar in the RA. The corticosteroid dose prescribed for all patients was 10 mg prednisolone.

All patients were informed about the treatment plan and were allowed to sign a written consent.

New complete dentures were constructed for all patients but those who already had one were evaluated for being satisfying and accepted to be used for surgical stent fabrication.

All patients received 2 implants supported and retained mandibular overdentures, the overdentures were retained using ball attachments.

Implant placement procedure:

The lower denture was duplicated using putty elastomeric impression material in a duplicating flask. CBCT were made for all patients with radiographic stent in place to check for the bone dimensions and type. Blue sky software (Blue sky Bio,LLC. planning software) was used to plan the implant sites in relation to the anatomical landmarks. Implants were placed in the mandibular canine region. Implants (Neo Biotech Co. Ltd, Seoul, Korea) were used 11.5mm in length and the diameter was 3.5mm.

1st stage surgery: All patients were given 1gm of Augmentin (GlaxoSmithKline (gsk) S.A.E) 1 hour before surgery but for RA patients they were given double their corticosteroid dose 1 hour before surgery in addition to the antibiotic. For all patients crestal incision was done using Bardparker's blade no.15 in addition to two releasing incision to prevent laceration. Drilling was done gradually till the final length then the implants were installed. Primary implants stability was measured after attaching the smart peg using Ostell (SE 411 01 Gothenburg Sweden) Then covering screws were inserted and the flap was repositioned and sutured. Patients were instructed to complete their antibiotic course in addition to analgesic(ketofane 20 mg (EUROPEAN EGYPTIAN PHARM. IND. - Alexandria - Egypt). Patients were left for osseointegration for 3 months after surgery.

Second stage surgery: Incisions were made on top of the implant sites guided by the surgical stent. The covering screws were removed, secondary implant stability was measured using Ostell **(fig.1)** and healing abutments were inserted. Patients were left for ten days for the mucosal healing then the procedure for new denture construction. Primary impression was taken conventionally using irreversible hydrocolloid with the healing abutments in place. The steps of denture construction were completed conventionally till insertion. After all denture insertion steps were completed, the healing abutments were removed and the ball attachments (SE 411 01 Gothenburg Sweden) were inserted with the retentive caps in place. Recess was made opposite the attachment; self-cured acrylic resin was mixed and applied in the recess. The overdenture was then seated in place and the patient was instructed to close in centric position till complete curing of the material. After curing the overdenture was removed and the fitting surface was checked for successful pick up. Post insertion appointment for the patients was scheduled for any discomfort. The patients were left for 1 months then implants stability was measured again to determine effect of loading on implants stability.

Fig. (1) Measuring implant stability

Data were analysed using SPSS 17 (SPSS Inc, Chicago, IL,USA). Two way ANOVA test and Bonferroni's post-hoc test were used. Results are shown in table 1 and figure 2

RESULTS

This study was conducted to compare implant stability in Rheumatoid and non Rheumatoid patients.

Regarding the changes in implant stability within each group:

In rheumatoid patients: There was statistically non significant change in implant stability through the whole follow up period (p=0.99)

In non Rheumatoid patients: There was statistically non significant change in implant stability through the whole follow up period (p=0.99)

Regarding the changes in implant stability between the two groups:

On the day of implant installment there was no statistically significant difference in implant stability between both groups where the mean value of stability for NR was 76 ISQ which was the same as that of RA patients.

Three months after installment there was no statistically significant difference in implant stability where the mean value of stability for NR was 76 ISQ while that of RA patients was 76 ISQ.

One month post loading there was no statistically significant difference in implant stability although the mean value of stability for NR was 75 ISQ while that of RA patients was 75 ISQ.

TABLE (1) Showing the mean values of implant stability (ISQ) in both groups

	Rheumatoid patient(RA)	Non rheumatoid patient(NR)	
Installment day	70± 32	70±40	
3 months after installment	75±47	76±37	p=0.99
one month post loading	75±35	75±38	ns

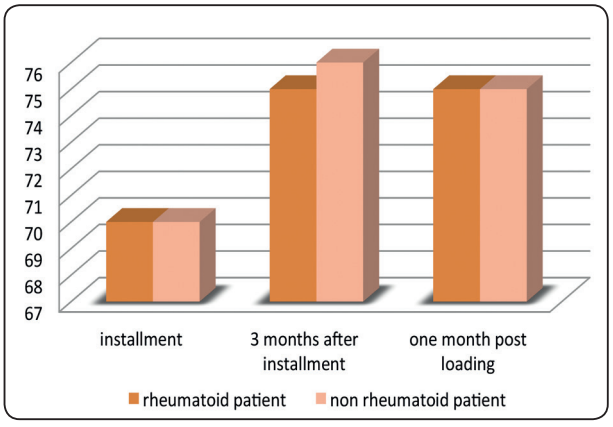

Fig. (2) Bar chart showing changes in implant stability in rheumatoid and non rheumatoid patients

DISCUSSION

Implant placement is a delicate surgical procedure requires significant care to avoid over stressing or injuries to bone.[11] Osseointegration is a multifactorial process that depends on several conditions as systemic condition of the patient, anatomic and immunity related conditions.[12-15] Special care is required for some patients as those suffering from autoimmune disorders as RA that affects bone turnover. However in this study both RA patients and non Rheumatoid patients showed reasonable implant stability results. For RA patients the results of stability were satisfactory this was attributed to the site of implant placement .i.e. mandible; as some studies have reported maxillary implant placement as a risk factor which may be due to the type of bone that differs from mandible to maxilla.[16-20] Most of the studies were performed on extra oral bone as tibia and fibula in which are believed to be more affected by corticosteroids than oral bone as the mandible with titanium implants.[21-23] Also the dose of corticosteroids taken by the patients may affect the bone quality. This can explain the satisfactory results of the study. Others stated that once osseointegration has occurred, the long-term prognosis for the implant is favourable, even with the use of glucocorticoids due to the fact that it occurred in difficult circumstances provided that the patient maintained proper oral hygiene regimen.[24-26] Also RA is an autoimmune disease that mainly targets the body joints so its effect in the other parts of bone is insignificant.

CONCLUSION

Within the limits of this study it was concluded that there was no difference in the implant stability for rheumatoid and non rheumatoid patients.

Therefore rheumatoid arthritis is not an absolute contraindication for implant placement.

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