Study to evaluate the effectiveness of bone grafting during lateral ridge split and immediate insertion of dental implants in the posterior mandible

Shashikant Shashikant Phatke¹; Sumanth Sumanth Shivaswamy²; Akshay Akshay Dighe²

¹M.A. Rangoonwalla dental college and Research Centre Azam Campus, India; ²India

Background: Problem of resorbed ridges and the ways to add hard and soft tissue in defective sites to provide adequate height and width for appropriate implant insertion has still remained challenging. Inadequate width of the residual ridge in the posterior mandible is a very difficult clinical situation, because the only option of fixed restoration in these areas is through dental implants. Horizontal osteodistraction of the apical end has been found to be beneficial. The major drawback of this procedure is the treatment time which exceeds a period of 6 months. Immediate insertion of the implants following ridge split procedure in the mandible is desirable. It has definite advantages in terms of, reduced treatment time, the implants prevents the collapse of distended buccal and lingual walls, less amounts of biomaterials required. In this study, lateral ridge split was performed with simultaneous implant insertion in the posterior mandible with/without the use of interpositional bone grafts.

Aim/Hypothesis: The aim of the study was to clinically and radiographically evaluate and compare the effectiveness of lateral ridge split procedure in the posterior mandible with/without the use of interpositional bone graft.

Material and Methods: A total number of 20 sites with edentulous posterior mandible distal to the canine were included in the study. Ten sites were included in group 1 and 10 sites in group 2. The dental implants that were used in the study was Myriad plus (Equinox Sales India Ltd). The piezo surgical unit was used for splitting the ridge. (Osada Inc. Japan). The bone expansion kit was used for expanding the split ridge. (Osada Inc. Japan). Inclusion criteria: a. Patients in the age group 18–50 years, with loss of single or multiple teeth in mandibular posterior region with inadequate width (5 mm) and height of ridge (>10 mm) from the superior border of the mandibular canal/mental foramen. b. Siebert’s class I ridge deformities – buccolingual loss of tissue with normal apico-coronal ridge height. c. Systemically healthy individuals. d. Individuals with good periodontal status were taken. A midcrestal incision was given followed by two vertical releasing incisions. After raising full thickness mucoperiosteal flap mid crestal osteotomy was performed, then vertical osteotomies were performed. In one group implants were inserted without bone graft and in the other group interpositional bone graft was used. The implants were loaded after 3 months with permanent prosthesis of porcelain fused to metal in both the groups. CBCT analysis, Resonance frequency analysis, crestal bone levels and survival of dental implants were the criteria assessed at the time of placement, postoperative 3 months and at 6 months in both the groups.

Results: The average (median) age did not differ significantly between 2 study groups (P-value > 0.05). The distribution of sex did not differ significantly between 2 study groups (P-value > 0.05). The average (median) pre-op, immediate after placement, 3- and 6-months width of ridge did not differ significantly between 2 study groups (P-value > 0.05 for all). The average (median) crestal bone height (at buccal, lingual, mesial and distal sites) at immediate after placement, 3- and 6-months did not differ significantly between 2 study groups (P-value > 0.05 for all). The average (median) ISQ (RFA) at immediate after placement did not differ significantly between 2 study groups (P-value > 0.05). The average (median) ISQ (RFA) at 3-months post-op follow-up is significantly higher in without bone graft group compared to with bone graft group (P-value < 0.05). The distribution of incidence of success of the implant did not differ significantly between 2 study groups (P-value > 0.05).

Conclusions and Clinical Implications: Lateral ridge split followed by immediate insertion of dental implants without the use of bone grafts in the posterior mandible can be used as an alternate predictable treatment option.