Expansion of Mandibular Knife-Edge Ridge and Simultaneous Implant Placement to Retain Overdentures: One-Year Clinical and Radiographic Results of a Prospective Study

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Abstract

Purpose: The aim of this study was to evaluate and compare the clinical and radiographic outcomes of two implants placed in expanded mandibular knife-edge ridge and implants placed in unexpanded ridges to retain overdentures.

Materials and methods: Fifteen completely edentulous patients with knife-edge ridges at canine areas of the mandible received two implants using the ridge expansion technique (study group, SG). Expansion was performed using piezoelectric corticotomy, and self-threading expanders. The control group (CG) comprised patients who received two-implant at canine areas without ridge expansion but were all case matched to SG and served as historical cohort. In both groups, mandibular overdentures were connected to the implants with Locator attachments 3 months after implant placement. Clinical (Plaque index; PI, Gingival index; GI, Probing depth; PD, and implant stability; ISQ) and radiographic (Vertical bone loss; VBL) parameters were recorded at time of overdenture insertion (base line, T0), 6 months (T6), and 12 months (T12) after insertion.

Results: The cumulative success rates were 100% and 96.4% for CG and SG, respectively, without significant difference between groups. All tested parameters increased significantly with advance of time in both groups. There was no significant difference in PI, GI, PD, and ISQ between groups. However, SG recorded significant higher VBL than CG at T6 and T12.

Conclusion: Expansion of mandibular knife edge ridge and simultaneous placement of implants to retain overdentures is associated with clinic and radiographic outcomes comparable to implants placed in unexpanded ridges after 1 year. However, long term randomized controlled trials with sufficient sample size are still needed to ensure the findings of the present study.

KEY WORDS: implant, knife-edge ridge, mandibular, overdentures, ridge expansion

INTRODUCTION
The York consensus statement on overdentures concluded that two implants placed in the interforaminal region of the mandible to retain overdentures should be the minimum standard of prosthetic care for edentulous patients. Such treatment provides better retention, stability, masticatory performance, patient satisfaction, quality of life, and cost compared to conventional dentures. The commonly used attachments for denture connection to the implants are ball, bar, magnetic, and resilient telescopic attachments. The locator attachments were introduced in 2001. These attachments are resilient, self-aligning, and available in different colors with different retention values. Moreover, they have dual retention and built-in angulation compensation. In addition, Locators can be used with limited interarch distance to reduce denture base fractures thanks to their low profile.

The long-standing mandibular edentulous ridge undergoes accelerated bone loss especially at the labial side of incisor and canine areas. The buccolingual width of crestal bone decreases by 3.1 to 5.9 mm, resulting in an estimated 60% loss of the original.

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