

Effectiveness of Using the Implant Fixture as a Ridge Expander

Fatemeh SamavatiJame; Abdusalam Alrmali,; Danyal Lohana,; Dhiraj Mallela; Hom-Lay Wang
Department of Periodontology and Oral Medicine, University of Michigan School of Dentistry



ABSTRACT

Multiple methods may be utilized to achieve ridge expansion. For instance, osteotomes and bone spreaders were designed with a tapered shape so that the smaller tip could be inserted in the osteotomy site, while the larger part pushes against the bony wall and expands the osteotomy. A similar effect may occur when an implant is placed in an underprepared osteotomy bed. However, **NO** study so far has investigated the **ridge expansion effect of an implant fixture** itself.

Materials and Method

In a clinical trial with **102** patients, dental implants were placed (3.1 mm to 4.8 mm diameter) in the upper or lower jaws. Measurements were taken before and after the **osteotomy** and after **implant placement** at specific points, focusing on alveolar bone ridge width and buccal bone thickness. Bone quality was evaluated using Lekholm and Zarb's scoring system. SPSS software analyzed the data, employing ANOVA tests to identify significant differences in measurements. The study aimed to enhance understanding of optimal **dental implant** procedures and **patient satisfaction**.

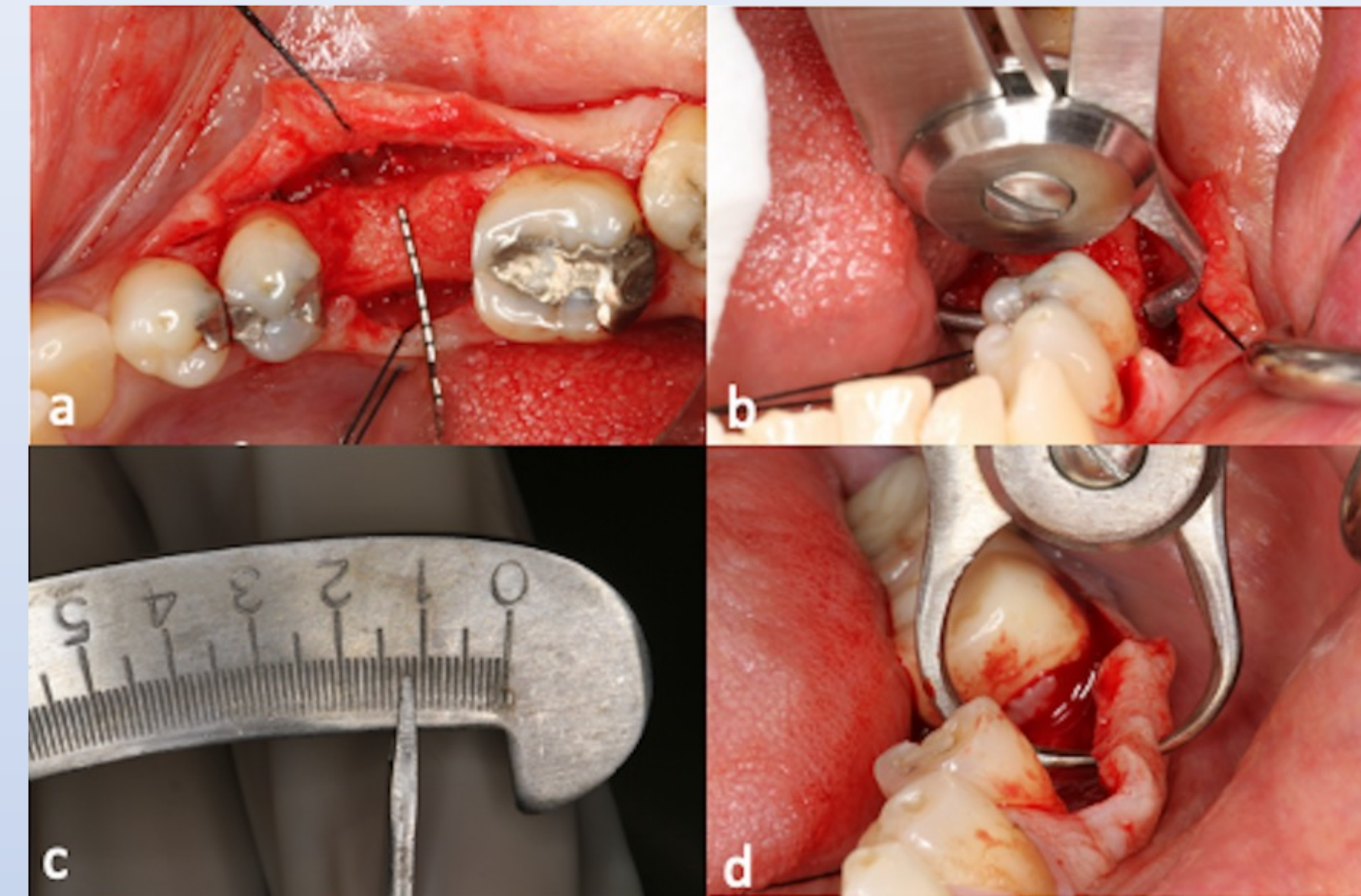
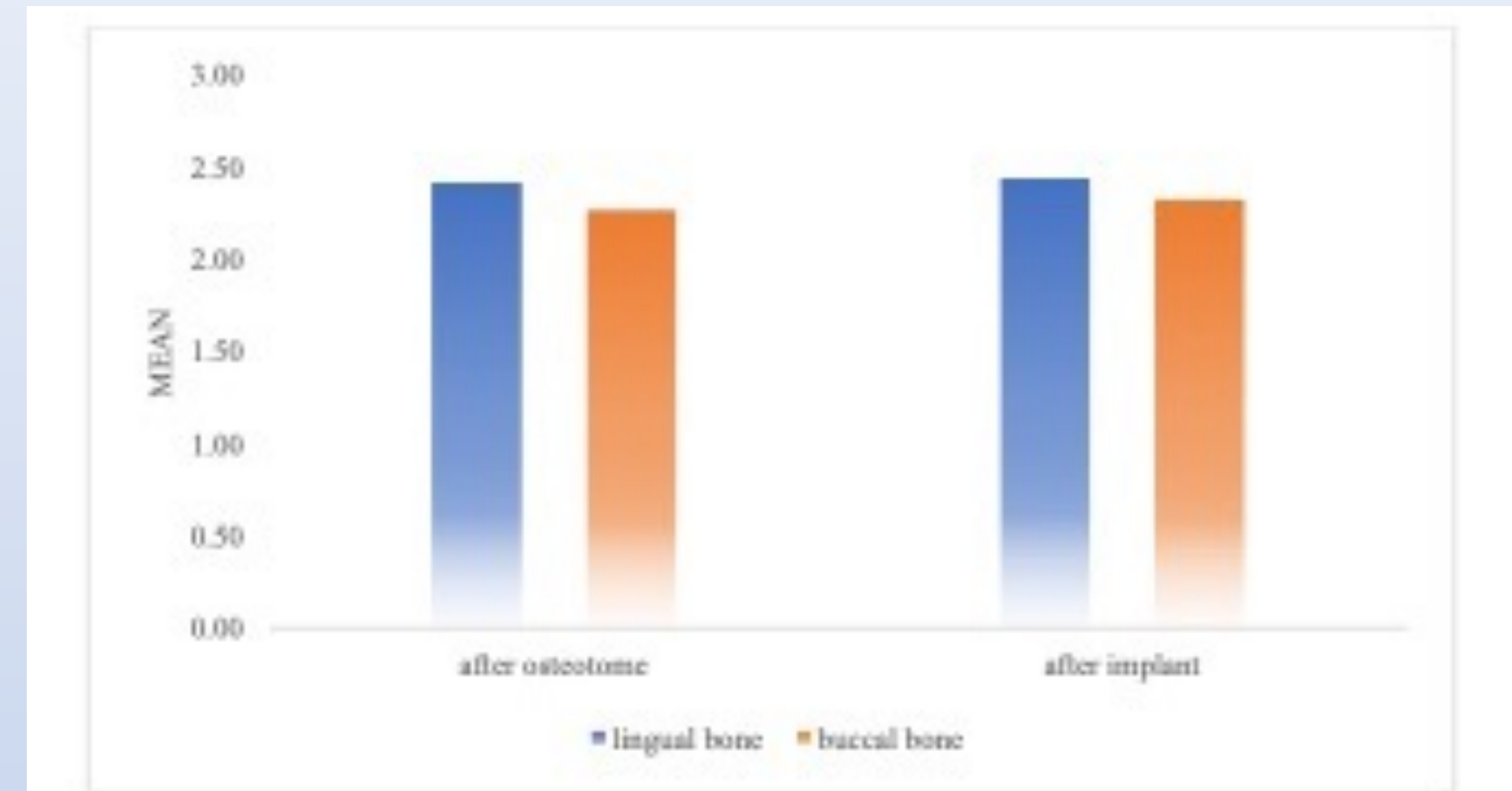


Fig 3. Changes of buccal and lingual bone before and after implant

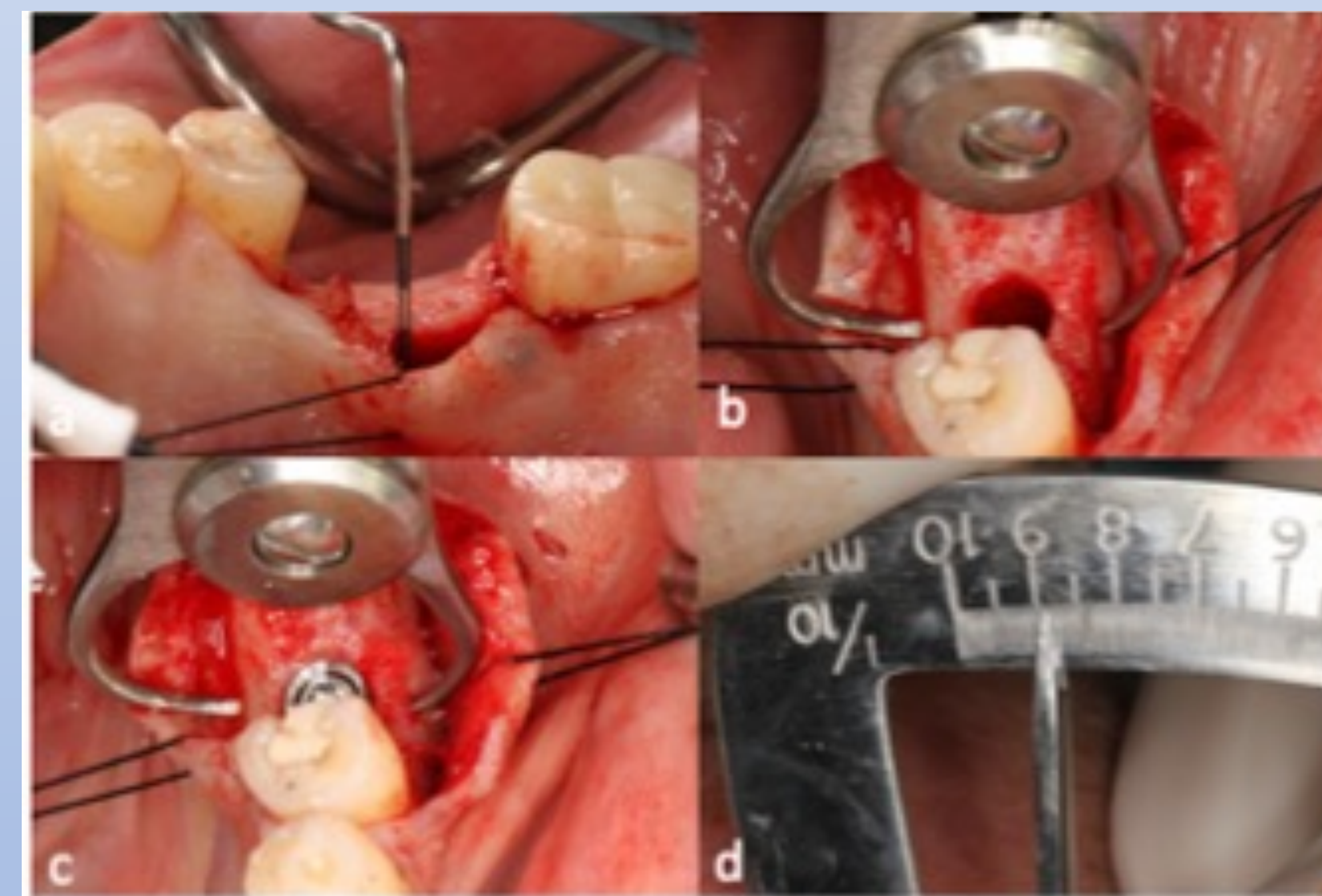
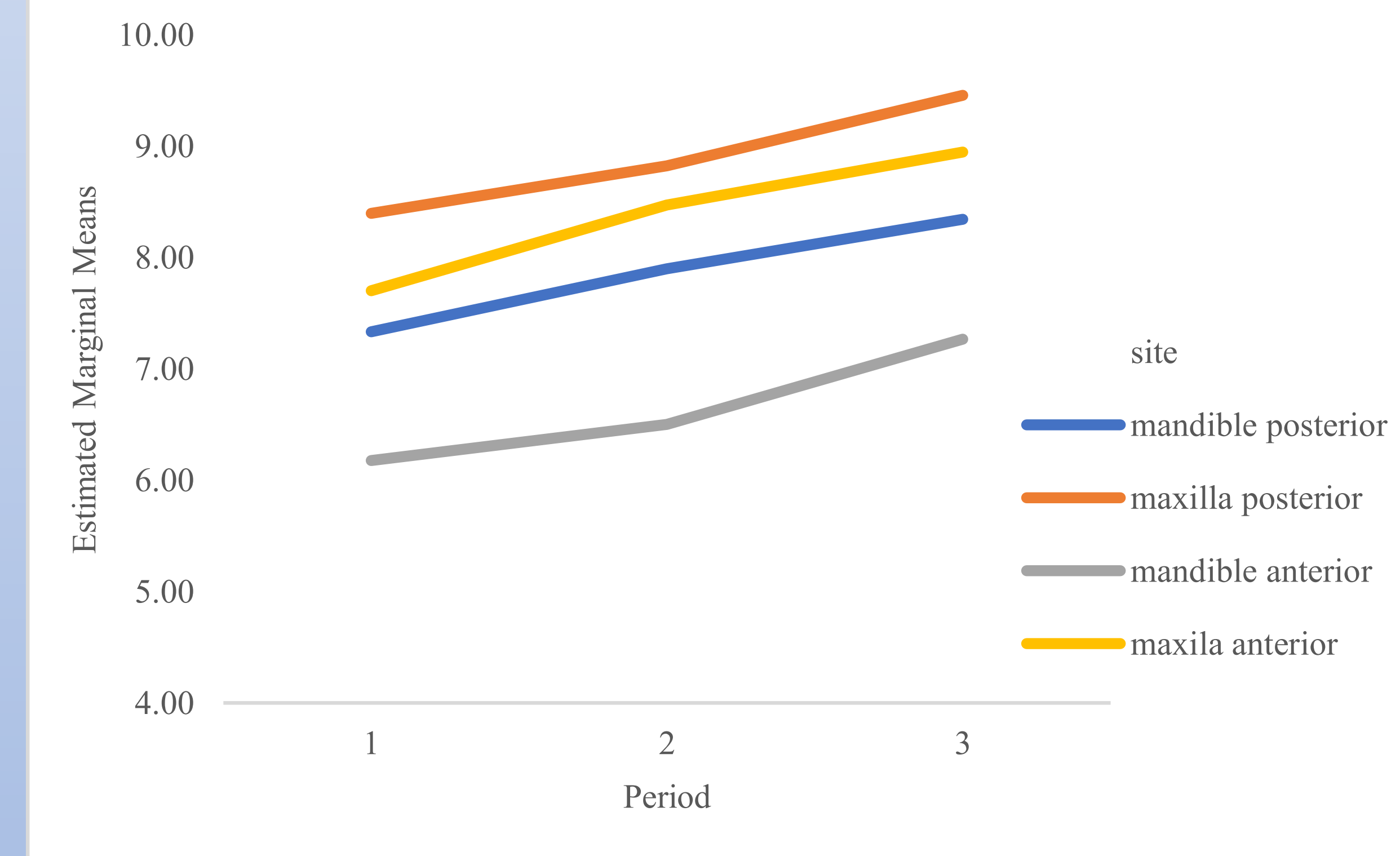


Fig 4. Changes of ridge width before osteotomy, before and after implant by site

CONCLUSIONS

1. Dental implants can effectively expand ridges during the procedure.
2. Factors affecting expansion:
 - a) **Larger implant** diameter is **more effective**.
 - b) **Posterior upper** region is **better** for ridge expansion.
 - d) **Parallel implants** are preferable for **successful ridge expansion**.

RESULTS

The study found that previous ridge augmentation **negatively** affected **bone quality** compared to those without prior augmentation. Patients **without** prior augmentation had **better bone quality**, explaining around 15% of the bone quality variance. During implant surgery, larger implants significantly increased ridge width, with effects varying by **location** and **size**. Implant diameter also influenced changes in ridge width, particularly at the **2mm** point, with larger diameters leading to more significant alterations. **Buccal** bone **didn't** show notable **effects**, but **lingual bone** changes were influenced by implant diameter. The study highlighted the superiority of parallel implants over tapered ones, emphasizing the role of implant design in achieving positive outcomes.