Upper Alveolar Ridge in Edentulous Patients and Caldwell Luc Surgery

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Abstract The aim of this study is to understand the upper alveolar ridge changes and its impact on Caldwell Luc surgery, in a patient population from a Medical College Hospital. We undertook a study to measure the thickness of upper alveolar ridge in edentulous and edentulous patients, to know the difference between the two and its effects on Caldwell Luc surgery. The finding of the study led us to conclude that the upper alveolar ridge is quite thin in edentulous patients and requires care while scraping the unhealthy mucosa from the floor of the maxillary sinus in Caldwell Luc surgery.

Keywords Upper alveolar ridge · Bone resorption · Edentulous · Caldwell Luc · Maxillary sinus · Otoantral fistula

Introduction

The upper alveolar ridge is intimately related to the floor of the maxillary sinus. The persons losing teeth either due to pathologic and physiologic changes is on the rise. Many people have become edentulous due to road traffic accidents [1] these days.

We undertook a study to know the upper alveolar ridge difference in dentulous and edentulous patients.

Aims and Objectives

To know the difference in upper alveolar ridge in dentulous and edentulous patients.

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Material and Methods

The patients undergoing sinus surgery for whom CT-scan has been done were gathered and the upper alveolar ridge thickness was measured from root of the teeth to the floor of the maxillary sinus.

The same procedure was repeated in edentulous patients, who had visited the dental department for complete denture.

Inclusion criteria: <50 years

Exclusion criteria: >50 years

Statistics

400 CT scans of dentulous patients undergoing sinus surgery were collected. The distance between the roots of the teeth to the floor of the maxillary sinus was measured. Dicom software was used for this purpose.

In dentulous patients ($n = 400$):

Mean : 4.1573

Std. deviation : 1.3566

Std. error : 6.834

95 % CI : 4.1573 ± 0.1344

Whereas in patients, who had lost teeth due to various reasons and visited the dental department to get their complete dentures, CT scans were collected. The same procedure was repeated for 75 edentulous patients.

Mean : 0.7 mm

95 % CI : 0.7 ± 0.23 mm

The limitation of the study is that the strength of the two groups were imbalanced, we could not find edentulous

patients in the above age criteria, so the two groups were not of equal strength.

Discussion

Alveolar ridge resorption after teeth extraction is a known phenomenon. It is a chronic, gradually progressive and a cumulative process [2] which takes place in edentulous patients. The rate of resorption of the upper alveolar ridge takes place due to various factors.

The more the duration of edentulousness, the more the resorption of the alveolar ridge. Systemic diseases which have a role in calcium [3] and phosphorus [4] metabolism, endocrine imbalances [5] due to parathyroid [6], estrogen [7], testosterone [7] imbalances accelerate the rate of bone resorption. Repeated trauma due to loose fitting denture, partial dentures, prosthesis are other factors having a role in accelerated alveolar ridge resorption. Sub mucous fibrosis, oral leukoplakia, erythroplakia, inflammatory conditions of the oral cavity due to other chronic disease cause bone resorption in the upper and lower alveolar ridge. Last but not the least, age [8] plays a major role in bone resorption of alveolar ridge, along with the duration of edentulousness.

It is a known fact that the floor of the maxillary sinus is thin in normal healthy individuals. It is intimately connected to the maxillary sinus in premolar and molar region. We, in our study have measured the distance from the roots of all the teeth of the upper alveolar ridge to the floor of the maxillary sinus. Then, the mean was calculated. This shows, the already thin floor of maxillary sinus, gets thinner in edentulous individuals due to bone absorption.

Keeping the above factors in mind, in Caldwell Luc surgery, scrapping of the unhealthy mucosa by an over enthusiastic surgeon or an inexperienced post graduate will lead to higher incidence of oroantral fistula.

We had two case of ora antral fistula in the last three years in the pre molar and canine regions of the upper alveolar ridge when Caldwell Luc surgery was done in edentulous patients. The post operative outcome was uneventful and follow-up was unremarkable.

In healthy people, the ora antral fistula is common in molar and premolar region, where as in edentulous patients, the ora antral fistula can occur in any region of the floor of the maxillary sinus.

One of the easiest methods for early diagnosis of bone structure changes in upper and lower jaws is clinical microdensitometry [9] using a standardized intra oral and panoramic radiograph.

Conclusion

Evaluation of edentulous alveolar ridge status is necessary before performing Caldwell Luc surgery. This little work-up will caution the surgeon to go slow while dealing with floor of the maxillary sinus in clearing the disease. This precaution will prevent any untoward (oroantral fistula) incident/complication from occurring which can be easily avoided.

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