

The prevalence of lower alveolar flat ridge among completely edentulous patients in Sulaimani



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Abstract

Objectives: The aim of the present study is to investigate the prevalence of lower flat ridge among a sample of completely edentulous patients, and to correlate it with age, gender, the presence or absence of a previous denture and the period of complete edentulism.

Materials and Methods: 297 patients with lower flat ridge were included in the study. A questionnaire was used to record the data of each patient which include; the gender, the age of the patient, the presence or the absence of a previous denture, and the date of the last tooth extraction (the period of complete edentulism). The patients were informed that the recorded information was required for a research purpose, and it will be used in a survey, and their consents and agreements were taken verbally. All the collected data were checked and assessed by a prosthodontic specialist. The patients age were divided into four groups; (41-50 years), (51-60 years), (61-70 years), (more than 71 years). The period of complete edentulism were divided into two groups; (up to 5 years), and (more than 5 years). The data were correlated and descriptive statistic of tables, numbers and percentages along with Chi-Square, were used to analyze the data.

Results: The results of the study showed that; 150 (50.505%) of the patients were males and 147 (49.494%) of the patients were females. The majority of the patients were from the age group (61-70) and (51-60) years in male and female respectively. No significant differences were found between gender and age group ($P > 0.05$). The occurrence of the lower flat ridge was significantly higher in patients with previous dentures 184(61.952%) than those without dentures 113(38.047%) in both genders ($P < 0.05$). Finally, the results revealed that patients who were completely edentulous for up to five years had significantly higher numbers of lower flat ridge 178(59.932%) comparing to those who were completely edentulous for more than five years 119(40.067%).

Conclusions: The presence of a previous denture, the longevity period of complete edentulism, the age, and the gender of the patient has an effect on the resorption of the lower residual ridge, and on the height of the lower residual ridge.

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Introduction:

Atrophy of the jaw bone following tooth loss is a multifactorial disease that is not attributable to prosthetics alone, as its occurrence is observed in a population without modern prosthetic treatment. The residual ridge undergoes a series of changes in shape and height following the pattern of resorption described for modern populations⁽¹⁾. Loss of teeth especially mandibular will frequently lead to a rapid reduction in the height of the alveolar process; this morphologic change in the residual alveolar ridges is considered to be a major oral disease entity.

The rate of resorption is related to anatomic, metabolic, functional and prosthetic factors, which affect relative activity of the bone forming cells and bone resorbing cells, and results either in bone formation or bone resorption depending upon the person individual resistance to these factors. The presence of teeth is necessary for the development of alveolar bone, and stimulation of this bone is required to maintain its density and volume, a removable denture (complete or partial) does not stimulate and maintain bone; it accelerates the bone loss, because the load from mastication is transferred to the bone surface only, not the whole bone As a result blood supply is

reduced, and total bone volume loss occurs⁽²⁾. The rate of resorption is supposed to be twice more pronounced in the mandible than in the maxilla during a period which follows teeth extraction and the ratio of 4:1 mandibular to maxillary resorption increases further⁽³⁾. The lower residual ridge has been classified according to different categories; among these, a classification according to the height of the lower residual ridge, which is determined by the amount of the remaining alveolar bone⁽⁴⁾:

Class I: The alveolar ridge is of an adequate height to give the denture support and resist lateral movement of the denture base.

Class II: The alveolar ridge has undergone some resorption; however, there is enough bone to give some resistance to lateral shifts of the denture.

Class III: The alveolar ridge is almost or completely resorbed, there will be little or no resistance to lateral shift of the denture.

In this view, this study was conducted to investigate the prevalence of lower alveolar flat ridge (Class III type residual ridge) among a sample of completely edentulous patients, and to correlate it with age, gender, the presence or absence of a previous denture, and the period of complete edentulism.

Materials and Methods:

Table 1: The distribution of lower flat ridge according to gender and age groups with Chi-Square test

Age groups	Male (No. & %)	X ²	Female (No. & %)	Total (No. & %)
(41-50) years	18(6.060%)		33(11.111%)	51 (17.171%)
(51-60) years	47(15.824%)		53(17.845%)	100 (33.670%)
(61-70) years	61(20.538%)	X ² = 9.56 P= 0.1794*	48(16.161%)	109 (36.7%)
(Over 71) years	24(8.080%)		13(4.377%)	37 (12.457%)
Total No. & %	150(50.505%)		147(49.494)	297 (100%)

*Non-significant P > 0.05

Patients undergoing routine prosthodontic treatment were drawn from the clinics of prosthodontic department school of dentistry, Sulaimani University, and from the Prosthodontic clinic at Shorsh Specialist Dental Center, to participate in this study, for the period of up to one year duration. The study population consisted of 297 patients. The inclusion criteria consisted of patients from both genders, above the age of 40 years, having completely edentulous upper and lower arches with normal healthy mucosa. Only patients of the lower alveolar flat ridge (Class III type residual ridge) were selected to participate in this study. Diabetic patients and female patients with osteoporosis

were excluded from the study, medical information were taken from the patients verbally.

Intraoral examinations of all subjects were performed by one of the authors to examine the level, the shape, and the size of the lower residual ridge, based on the clinical picture, with plain mouth mirror under artificial light. The single-examiner concept was followed to maintain the consistency and to prevent inter-examiner bias⁽¹⁾.

A questionnaire was used to record the data that include; the gender, the age of the patient, the date of the last tooth extraction (the period of complete edentulism). The presence or the absence of a previous denture were recorded, the old denture condition were examined.

The patients age were divided into four groups; (41-50 years), (51-60 years), (61-70 years), (more than 71 years). The period of complete edentulism were divided into two groups; (up to 5 years), and (more than 5 years). The patients were informed that the recorded information was required for a research purpose, and it will be used in a survey, and their consents and agreements were taken verbally. The variables were correlated and descriptive statistic of tables, numbers and percentages along with Chi-Square, were used to analyze the data at a significant level (P<0.05).

Results:

The results of the study showed that; 150 (50.505%) of the patients were males, the majority of lower flat ridge 61(40.666%) were among the age group of (61-70 years);while 147 (49.494) of the patients were females and the majority of flat ridge 53(36.0544%) were within age group of (51- 60 years), no significant difference was found between gender and age groups (P > 0.05). Age group of (61-70) had the highest number 109 (36.7%) of the flat ridge in both genders collectively, (Table 1).

The results demonstrated that the occurrence of lower flat ridge was higher in those patients with

Table2: The distribution of lower flat ridge according to the gender, and the presence or the absence of previous denture with Chi-Square test

Presence or Absence of Previous Denture	Male No. & %	X ²	Female No. & %	Total No. & %
Presence of Previous Denture	90 (30.303%)		94 (31.649%)	184(61.952%)
Absence of Previous Denture	60 (20.202%)	X ² = 0.49 P= 0.0406*	53 (17.845%)	113(38.047%)
Total No. & %	150 (50.505%)		147 (49.494%)	297(100%)

*Significant P < 0.05

previous denture 184(61.952%) than those without denture 113(38.047%) and a significant difference were found between both genders in both groups with and without previous dentures, (P<0.05), (Table 2).

In the correlation between the longevity period of edentulism and lower flat ridge , those who were completely edentulous for up to five years had significantly higher rate 178(59.932%), as compared to those who were completely edentulous for more than five years 119(40.067%),(P=0.05). The number of lower flat ridge was more in male patient who were completely edentulous in up to 5 years 94(31.649%), whereas the lower flat ridge number was more in female patients who were completely edentulous for more than 5 years 63(21.212%), (Table 3).

Discussion:

Loss of teeth leads invariably to atrophy of the residual alveolar ridge that is irreversible, chronic, progressive and cumulative^(1,5).The rate of atrophy varies greatly among different individuals, and even within the same person at different times or in different regions within the jaw^(5,6), an apparent result of alveolar bone atrophy will create a problem to the prosthodontist in constructing a complete denture, as the presence of a good alveolar ridge is crucial to have a successful functioning complete denture.

The outcome of the present study revealed insignificant difference between gender and age in relation to occurrence of lower flat ridge (P>0.05), this finding came in consistence with that of Zmysłowska et al., (2007) who stated that; no association was found between the age or gender of patients and the grade of mandibular alveolar resorption⁽⁷⁾. However; the study result showed that the highest rate of lower flat ridge among male patients was within the age group of (61-70 years), while the majority of flat ridge in females patients was within the age group of (51- 60 years), this finding indicates that females became completely edentulous earlier in their lives, than males do, in a period of life which represent the menopausal age for most of the females, and as a consequence of this early complete edentulism, they will end up with higher rate of lower flat ridge among younger age groups than males (Table 1). Bone loss is considered to commence in humans at 35–40 years of age, after which, the peak bone mass has been achieved, and the atrophic processes then continue with varying intensity, accelerating in the menopausal period of women as compared to men^(8,9). This finding came in agreement with many other studies where female gender was a risk factor for greater resorption and among the other systemic causes, only postmenopausal osteoporosis has been shown to have a cause-effect relationship with residual ridge resorption⁽¹⁰⁻¹²⁾.

Table3: The relation between gender, period of edentulism, and the lower flat ridge with Chi-Square test

Period of edentulism	Male No. & %	X ²	Female No. & %	Total No. & %
Up to 5 years	94(31.649%)		84(28.282%)	178(59.932%)
More than 5 years	56(18.855%)	X ² = 0.94 P = 0.0563*	63(21.212%)	119(40.067%)
Total No. & %	150(50.505%)		147(49.494%)	297 (100%)

*Significant P = 0.05

The study results showed that the presence of a previous denture had an effect on the resorption of lower residual ridge, as lower flat ridge number was significantly higher in those patients who had previous denture comparing to those without denture ($P < 0.05$). This result came in consistence with the result of other studies which stated that; as complete dentures do not load the alveolus in the same way as the original teeth do, non-physiological pressure is applied to the bone surface of the affected jaw, which might be a reason for increased resorption. This is particularly possible for ill-fitting dentures that cause occlusal disharmonies and thus might enhance alveolar bone loss⁽¹³⁾. Hence, the quality of the denture as a holistic system is crucial to prevent local overloading of the underlying bone⁽¹⁴⁾, and as mentioned previously, the previous dentures condition in this study were examined, and most of them were ill fitted or old, and in need of replacement. The present study showed an inverse association between period of edentulism & the number of flat ridge, as the period longevity of edentulism increases the number of lower flat ridge decreases, those who were completely edentulous for up to five years had higher numbers of flat ridge compared to those who were completely edentulous for more than five year, this result could be supported by Sennerby study⁽¹⁵⁾,

who stated that; although resorption is the greatest during the first year after tooth loss; but the reduction of the residual ridge is a life-long process, and also could be explained by Denissen⁽¹⁶⁾ study who stated that; the rate of bone loss does decrease, atrophy of the jaw bone can be slowed down, but unfortunately cannot be eliminated. This result was in disagreement with Al-Jabrah⁽¹⁷⁾ study, who concluded that; the amount of mandibular residual ridge resorption was directly related to the number of years subjects were edentulous.

Conclusions:

The resorption of the lower residual ridge is a multifactorial physiological process, difficult to be controlled, and in need of multiple investigations to be assessed thoroughly. With the limitation of the present study, and the difficulty of radiographic investigation, it was concluded that: the age of the patient, the gender, the period of edentulism, and the presence or the absence of a previous denture, are factors that have an effect on the resorption of the lower residual ridge.

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