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Prevalence of lower alveolar flat ridge among completely edentulous patients in Kashmir population

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Abstract
Objectives: The purpose of the present study is to investigate the prevalence of lower flat ridge among a group of completely edentulous patients in Kashmir population, and to correlate it with age, gender, the presence or absence of a previous denture and the period of complete edentulism.
Materials and Methods: 100 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; (40-50 years), (51-60 years), (61-70 years), (more than 71 years). The period of complete edentulism were divided into two groups; (up to 4 years), and (more than 4 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; 64 (64%) of the patients were males and 36 (36%) of the patients were females. The majority of the patients were from the age group (51-60) and (40-50) years in male and female respectively. The occurrence of the lower flat ridge was significantly higher in patients with previous dentures 75(75%) than those without dentures 25(25%) in both genders. Finally, the results revealed that patients who were completely edentulous for up to four years had significantly higher numbers of lower flat ridge 55(55%) comparing to those who were completely edentulous for more than four years 45(45%).
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.

Keywords: resorption, alveolar ridge, lower flat ridge

Introduction
Atrophy of the alveolar process of maxilla and mandible following tooth loss is a multifactorial process that cannot be attributable to prosthetics alone. The residual ridge undergoes a series of changes in shape and height following tooth extraction. Loss of teeth especially in mandibular arch will frequently lead to a rapid reduction in the height of the alveolar process. 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. 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. 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 [1].
Classification of mandibular ridge according to the height of the lower residual ridge

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 perspective, 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

Patients visiting to the Department of Prosthodontic, Government Dental College & Hospital, Srinagar and undergoing routine prosthodontic treatment were selected to participate in this study, The study population consisted of 100 patients.

Inclusion criteria

Both male & female patients above 40 years of age 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.

Exclusion criteria

Diabetic patients and female patients with osteoporosis were excluded from the study.

Research Methodology

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.

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 4 years), and (more than 4 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 ($P<0.05$).

Table 1: The distribution of lower flat ridge according to gender and age groups

Age group	Males (Number and percentage)	Females (Number and percentage)	Total (Number and percentage)
40-50 years	10(10%)	15(15%)	25(25%)
51-60 years	28(28%)	12(12%)	32(32%)
61-70 years	15(15%)	5(5%)	20(20%)
71years above	11(11%)	4(4%)	15(15%)
Total No. and percentage	64(64%)	36(36%)	100(100%)

Table 2: The distribution of lower flat ridge according to the gender, and the presence or the absence of previous denture

Presence or absence of previous denture	Males (Number and percentage)	Females (Number and percentage)	Total (Number and percentage)
Presence of previous denture	45(45%)	30(30%)	75(75%)
Absence of previous denture	15(15%)	10(10%)	25(25%)
Total No. and percentage	60(60%)	40(40%)	100(100%)

Table 3: The relation between gender, period of edentulism, and the lower flat ridge

Period of edentulism	Males (Number and percentage)	Females (Number and percentage)	Total (Number and percentage)
Upto 4 years	30(30%)	25(25%)	55(55%)
More than 4 years	38(38%)	07(07%)	45(45%)
Total No. and percentage	68(68%)	32(32%)	100(100%)

Results

The results of the study showed that; 64 (64%) of the patients were males, the majority of lower flat ridge 28(28%) were among the age group of (51-60 years); while 36 (49.494) of the patients were females and the majority of flat ridge 15(15%) were within age group of (40- 50 years), Age group of (51-60 years) had the highest number 28 (28%) of the flat ridge in males where as age group of (40-50 years) had the highest number 15 (15%) in female gender (Table 1).

The results demonstrated that the occurrence of lower flat ridge was higher in those patients with previous denture 75(75%) than those without denture 25(25%) and a significant difference were found between both genders in both groups with and without previous dentures (Table 2).

In the correlation between the longevity period of edentulism and lower flat ridge, those who were completely edentulous for up to four years had significantly higher rate 55(55%), as compared to those who were completely edentulous for more than four years 45(45%). The number of lower flat ridge was more in female patient who were completely edentulous in up to 4 years 25(25%), whereas the lower flat ridge number was more in male patients who were completely edentulous for more than 4 years 38(38%), (Table 3).

Discussion

Loss of teeth leads invariably to atrophy of the residual alveolar ridge that is irreversible, chronic, progressive and cumulative [1, 2]. 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 [2, 3], 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 important to have a successful functioning complete denture. The outcome of the

present study revealed significant difference exists between gender and age in relation to occurrence of lower flat ridge.
However; the study result showed that the highest rate of lower flat ridge among male patients was within the age group of (51-60 years), while the majority of flat ridge in females patients was within the age group of (40- 50 years), this finding indicates that females became completely edentulous earlier in their lives, than males, the reason that has been cited for this is due to 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 [4, 5]. 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 [6-8]. The results of this study 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.

Conclusions

It can be concluded from this study that 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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