

COMPLETE DENTURES FRACTURES –CAUSES AND INCIDENCE

Dan Nicolae Bosânceanu¹, Antonela Beldiman², Raluca Elena Baciuc³, Maria Bolat³,
Dana Gabriela Bosânceanu¹, Norina Consuela Fornă⁴

1-Lecturer Department of Removable Dentures,UMF GR.T.POPA IASI

2-Assist Dentures Technology UMF GR.T.POPA IASI

3-Assist Dental Materials UMF GR.T.POPA IASI

4-Professor Department of Implantology and Removable Dentures, UMF GR.T.POPA IASI

Coresponding author:Dana Gabriela Bosinceanu

Grigore T Popa University of Medicine and Pharmacy Iași, Romania

Email:danab1978@yahoo.com

INTRODUCTION:

Edentation is the culmination of preventive measures in chronic oral pathology and constitutes a significant public health problem worldwide. Rehabilitation of edentulous patients most commonly rely on conventional prosthetic and as a result of demographic change, the number of enture wearers is forecasted to increase.

A complication that occurs frequently in patients treated with dentures is fractured dentures. Both base and denture teeth are the most common fracture failures and require attention as this can cause discomfort and even not wearing dentures.

In Romania, as in many other European countries, removable denture acrylic base fracture is a common problem, however acrylic resin material is affordable for the elderly edentulous requiring

specialized prosthetic treatment.

PURPOSE:

The purpose of this study was to evaluate the frequency of dentures fractures for a group of patients who presented for denture repair during two years and were analised:

- types of fracture
- patients age and denture age
- causes for fractures

MATERIAL AND METHODS:

The group of patients,was represented by dentures weares, who came in our clinic for repair the fractured dentures from 2013to 2015, the number of prostheses analyzed in this study was 200 .

Each patient had an observation sheet, noting all information related to fractured dentures.





A questionnaire was designed to collect the data necessary to carry out the assessment of different variables associated with denture fractures. The questionnaire consisted of 14 questions, which have targeted a number of factors accounted as incriminated in producing fractures .

Questionnaires were completed by patients with a dentist. , ensuring that the

questions were understood in patients with assistants, the latter being responsible for the accuracy of responses. Questions addressed to the number of fractures suffered by denture, fracture site, cause of fracture, number of fractures, whether or not the bad habits could cause fractures, age and of patient and of dentures The obtained data were summarized in the tables.

Questionnaire I-history of denture fracutres

sex:	masculin()	feminin()				
age	40-50ani()	51-60ani()	61-70ani()	71-80ani()	>80ani()	
Dentures age:	0-2()	2-4()	4-6()	6-8()	8-10()	>10 ani
Have you had fracture denture	da()	nu()				
Which one:	maxilara()	mandibulara()	ambele()			
How long have you wear it fractured:	6 luni-1an()	1-2ani()	2-3()	3-4()	4-5()	> 5ani()
Hao many fractures for the upper:	o data()	de două ori()	>două ori()			

How many fractures for the lower:	o data() de două ori() >două ori()
Cause of fracture:	accidental () instabilitatea() în timpul masticației() altele()
Place of fracture:	linia mediană() : unică() multiplă() marginea protezei():unică() multiplă() dinți fracturați():unic() multipli()
Is the first fracture in this place :	da() nu()
How many fractures in this place:	1() 2ori() mai multe ori()
Have you ever repaired:	1() 2ori() mai multe ori()
Vicious habits:	bruxism() onicofacie() roadeți diverse obiecte() altele()

Data collected from the questionnaires were then summarized in tables according to the following variables:

- ▶ patient age
- ▶ denture age
- ▶ cause of fracture

- ▶ number of fractures
- ▶ fracture places

RESULTS AND DISCUSSIONS:

After analyzing the results by denture age were reached following results

Denture age	Dentures number
0-2	42
2-4	56
4-6	32
6-8	24
8-10	31
>10 years	15
Total	200

Tabel I-nr.fracture by denture age

Most fractures were observed in the age group of the denture from two to four years, followed by 0 to 2 years in third

dentures were between 4-6 years old, and those between 8 -10 years, 6-8 years and the oldest last 10 years

AGE	Dentures number
-----	-----------------

40-50 years	46
51-60 years	23
61-70 years	11
71-80 years	32
>80 years	78
Total	200

Tabel II-fractures by patient age

Patients in the age group most commonly affected was the > 80 years followed by between 40-50 years, which is more vigorous chewing and favorite foods are not the consistency group moale. Pe stood next place age 71-80 years, and 51-60 last gupă age was the 61-70 years.

Cases referred to dentures fractures in conjunction with clinical examination conducted by a doctor were also synthesized the following results noted in Table III

For maxillary dentures most common cause of fracture was identified as instability with a percentage of 25%, while for the mandible the most frequent cause of

accidental was dropping with a percentage of 53%.

Other causes in order of frequency for dentures were accidentally dropping by 25%, interference occlusal 16%, other causes by 10%, defects of polymerization have accumulated a 4% and in last place was located force triggered during mastication.

For mandibular dentures instability was the second main cause with 22%, followed by occlusal interferences 12% ,mastication forces with 8%, other causes 4% and in last place were located curing defects 2%

Tabel III-nr.motive of fractures

Fracture cause	Max denture	Mdb fracture
accident	13 (25%)	79 (53%)
instability	22(43%)	33 (22%)
Occlusal interferences	8(16%)	18 (12%)
Polymerization defects	2(4%)	03 (2%)
During mastication	1(2%)	12 (8%)
others	5(10%)	04 (3%)
TOTAL	51(100%)	149 (100%)

After analyzing the fractured prosthesis was observed that almost a third of them -107 were fractured at least 2 times, of course presenting a lower resistance to

masticatory forces,58 were broken once, from these the maxillary ones more frequently then the mandibular 38 to 22, 35 were broken twice, of which the maxillary

are in number of 22 and mandibular 13

Tabel IV-no fractures

Fractures	once	twice	>2 twice
maxillary	38	22	77
mandibular	20	13	30
TOTAL	58	35	107

It followed an analysis of areas prone to fracture, including the median, the PM, M. canine area, incisive and other areas. The data summarized in Table V was able to observe that the preferred target for the maxillary prostheses fracture and for the lower denture was midline (over 60%). Other

frequent sites for fracture were identified to be the incisal for maxillary dentures with 12% and 10% for mandibular dentures, canine area in lower dentures 14% and 4% for maxillary dentures, the last standing molar area with 8% for lower denture and 4% for the upper ones.

Fracture	Max denture	Mdb denture
median	32 (62%)	89 (60%)
Incisive zone	13(26%)	15 (10%)
Canine zone	2(4%)	21(14%)
PM zone	0	06 (4%)
M zone	2(4%)	12 (8%)
others	2(4%)	06 (4%)
TOTAL	51(100%)	149 (100%)

Tabel V-fractures by localization

Midline fracture is the result of cyclical deformations of the denture base during the stomatognathic system functions, while for the mandibular denture surface less and less thickness in the middle of the prosthesis are held accountable for fracture. Also, patient negligence during insertion and disinsertion of denture during cleaning are major causative factors of fractures. Accidental dropping of the prosthesis was the first ground of fracture in these cases, the lower being smaller had a fracture rate of 3: 1 to the upper ones.

The presence of diastema and thin margins of the dentures for aesthetic and comfort of the patients act as stressors

contribute to median maxillary fracture. The instability was the primary factor causing fractures of the lower dentures so that this study meets Bely and von Fraunhofer's study suggesting that the instability is the main reason for fractures . Mathews and Wain show that tensile stresses are primarily felt on the palate.

Other causes of fracture are occlusal interferences (upper denture 16% to 12% in the lower ones). Many of dentures in the study were opposed to natural dentition and most of them were not properly balanced occlusal leading to unwanted forces in the weakest parts of the dentures. Occlusal close contacts of the natural teeth and denture

acrylic lead to powerful forces and lead to interference constant during chewing movements. Incorrect installation of teeth outside the ridge led to excessive concentration of forces in areas that were not designed to withstand high pressure of the prosthesis.

CONCLUSIONS:

Following this clinical trial can draw the following conclusions

1. Occlusal interference elimination and achieving a balanced bilateral occlusion by principle of Gysi also help avoid fractures

2. Midline fracture was the most frequent for both type of dentures (more than 60%) contributing the presence of diastema and thin denture flanges for aesthetics and

patients comfort who act as stressors in maxillary denture

3. Also, negligence of the patient during insertion and disinsertion of denture during cleaning is a major factor causing fractures. Accidental dropping of the prosthesis was the first ground of fracture in these cases, the lower one being smaller had a fracture rate of 3: 1 to the upper one

4. The study showed that the most common fractures of dentures are in the group of two to four years age group followed by zero to two years. According to studies by Hargreaves, the physical properties of acrylate does not deteriorate with age, but clinical function can induce stress that after a period of use can bring damage to material and can hasten fracture

REFERENCES:

1. **Bellini D, Dos Santos MB, De Paula Prisco Da Cunha V et al.** Patients' expectations and satisfaction of complete denture therapy and correlation with locus of control. *J Oral Rehabil* 2009; 36: 682–686.

2. **de Castellucci Barbosa L, Ferreira MR, de Carvalho Calabrigh CF et al.** Edentulous patients' knowledge of dental hygiene and care of prostheses. *Gerodontology* 2008; 25: 99–106.

3. **Divaris K, Ntounis A, Marinis A et al.** Loss of natural dentition: multi-level effects among a geriatric population. *Gerodontology* 2012; 29: e192–e199.

4. **Kim SH, Watts DC.** The effect of reinforcement with woven E-glass fibers on the impact strength of complete dentures fabricated with high-impact acrylic resin. *J Prosthet Dent* 2004;91:274-80.

5. **Nejatidanesh F, Peimannia E, Savabi O.** Effect of labial frenum notch size and palatal vault depth on stress concentration in a maxillary complete denture: a finite element study. *J Contemp Dent Pract* 2009; 10: 59–66.

6. **Seo RS, Murata H, Hong G et al.** Influence of thermal and mechanical stresses on the strength of intact and relined denture bases. *J Prosthet Dent* 2006; 96: 59–67.

7. **Diana Diaconu, Monica Tatarciuc, Andrei Melinte, Anca Vitalariu,** Technological aspects in the construction of prosthetic rehabilitation without metal framework- *Romanian Journal of Oral Rehabilitation* , vol.5, no.3, july-september 2013, pg.84-90