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EVALUATION OF EFFECT OF EXCESSIVE OCCLUSAL FORCE ON THE SEVERITY OF CHRONIC PERIODONTITIS

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INTRODUCTION

Occlusal trauma has been defined as "A condition where injury results to the supporting structures of the teeth by the act of bringing the jaws into a closed position". **(**Stillman 1917) Recently, the American Academy of Periodontology (2000**)** changed the definition to "injury to the periodontium may result from occlusal forces in excess of the reparative/adaptive capacity of the attachment apparatus."

Chronic Periodontitis has been defined as "an infectious disease resulting in inflammation within the supporting tissues of the teeth, progressive attachment loss, and bone loss." (Carranza 2015). The relationship between occlusal force and the initiation or progression of periodontal disease has been controversial for over century. Early in the 20th century, excessive occlusal force was considered to be a major causative factor of periodontal destruction. (Academy of Periodontology, 1998). Later, the role of microorganisms in etiology of Periodontitis became more prevalent and studies questioned the role in progression of the disease. (Houston et al, 1987). On the other hand, trauma from occlusion is known to cause several changes in the periodontal tissues. (Serio, 1999 & Davies et al, 2001) The results of Branschofesky et al, 2011, indicated that secondary trauma from occlusion is frequently seen in periodontal compromised patients and is positively correlated with the severity of attachment loss. According to Consolaro, 2012, Occlusal overloads take months or years to induce the classic signs and symptoms of occlusal trauma.

So, the aim of this research is to detect signs of trauma from occlusion as manifested by Fremitus and radiographic evidence of vertical bone defect. And to relate this to the severity of Chronic Periodontitis as revealed by amount of clinical attachment loss (CAL).

AIMS OF THE STUDY

Detect signs of trauma from occlusion as manifested by positive fremitus and radiographic evidence of vertical bone defect. And to relate this to the severity of Chronic Periodontitis as revealed by amount of clinical attachment loss (CAL).

MATERIALS AND METHODS

This is an observational clinical research was performed on patient.

- They were 25 patients treated in Riyadh Elm University, college of Dentistry outpatient clinics. All participants signed informed consent.

Inclusion criteria

- 1-Patients diagnosed as Chronic Periodontitis as evident by CAL and bone loss and according to criteria defined by American Academy of Periodontology
- 2- Not having any systemic disease that may affect the periodontium.

Methods

Examination was performed by two examiners, inter examiner calibration was performed for determination of periodontal parameters, radiographic analysis and detection of fremitus.

For each patient, the following parameters were recorded

a) Probing pocket depth using UNC periodontal probe
b) Gingival recession on 4 surfaces (buccal, lingual, mesial and distal)
c) Clinical Attachment loss was measured on 6 sites in each tooth using direct method (from epithelial attachment to cervical line)
d) Periapical & bitewing radiograph
e) Degree of mobility according to Miller classification
f) Detection of Fremitus in all mandibular movements through index finger palpation on buccal surfaces of teeth.

STATISTICAL ANALYSIS

RESULTS

- After screening of patients, 25 patients with chronic periodontitis were selected for the study.

- All teeth were tested for mobility, fremitus, and vertical bone defect and were classified according to amount of clinical attachment loss into 3 groups: stage I, stage II & stage III, according to AAP classification, 2017.

	Age	Tooth number	Mobility grade	Gingival index	Plaque index	Fremitus	Type of movement
1	38	31	G II	2.1	1.5	+	Protrusive
2	38	41	G II	2.1	1.5	+	Protrusive
3	49	31	G II	1.8	1	+	Protrusive
4	49	41	G II	1.8	1	+	centric
5	68	21	G I	1.5	1.2	+	Protrusive
6	60	41	G II	1.2	0.9	+	Protrusive

Table 2: Trauma from occlusion with grade of mobility &clinical attachment loss.[1-2]

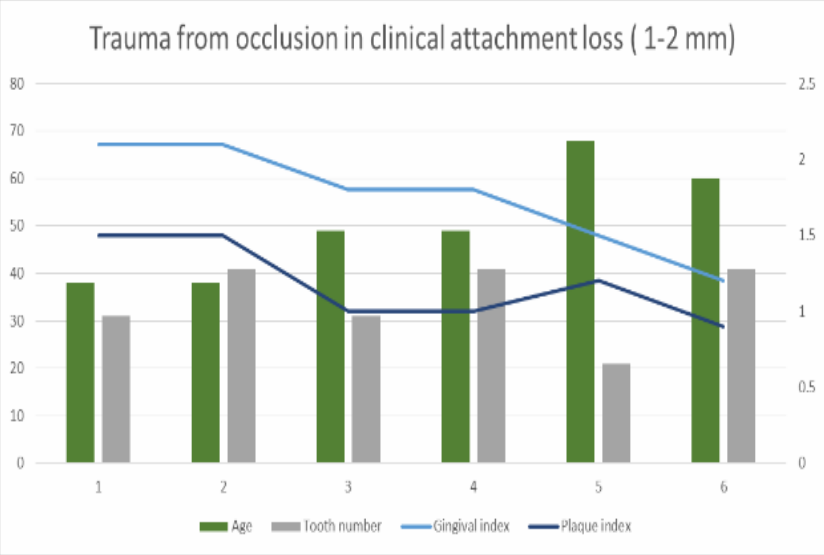
	Age	Tooth number	Mobility grade	Gingival index	Plaque index	Fremitus	Type of movement
1	62	42	G II	2	2.6	+	Protrusive
2	41	21	G I	2.2	1.5	+	Protrusive
3	41	41	G II	2.2	1.5	+	Protrusive
4	60	43	G II	1.3	0.4	+	centric
5	44	17	G III	1.8	1.5	+	Protrusive
6	68	22	G II	1.5	1.2	+	Protrusive

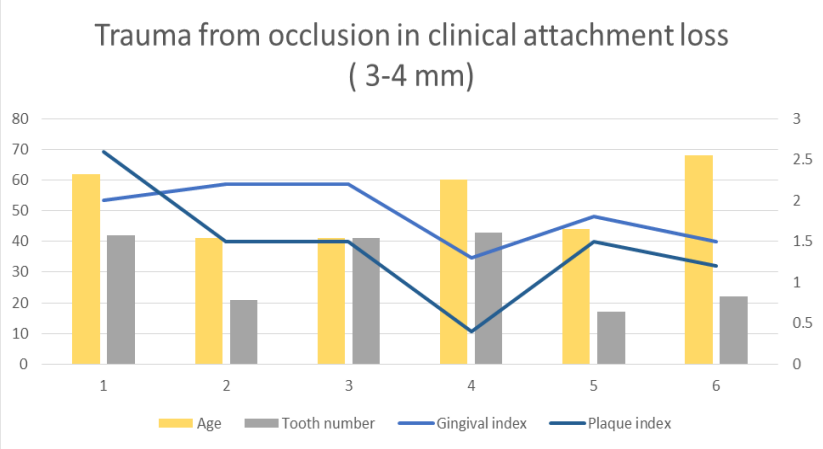
Table 3: Trauma from occlusion with degree of mobility & clinical attachment loss[3-4].

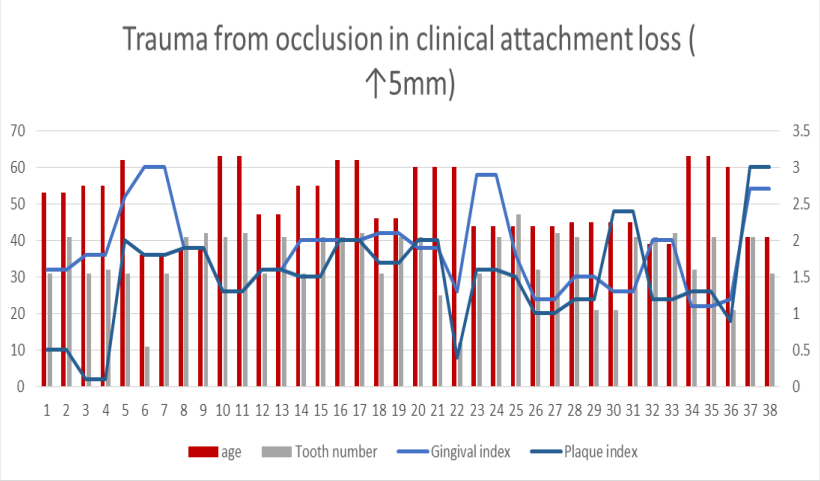
	Age	Tooth number	Mobility grade	Gingival index	Plaque index	Fremitus	Type of movement
1	53	31	G II	1.6	0.5	+	Protrusive
2	53	41	G II	1.6	0.5	+	Protrusive
3	55	31	G III	1.8	0.1	+	Protrusive
4	55	32	G III	1.8	0.1	+	Protrusive
5	62	31	G II	2.6	2	+	Protrusive
6	36	11	G II	3	1.8	+	Protrusive
7	36	31	G III	3	1.8	+	Protrusive
8	38	41	G III	1.9	1.9	+	Protrusive
9	38	42	G II	1.9	1.9	+	Protrusive
10	63	41	G III	1.3	1.3	+	Protrusive
11	63	42	G III	1.3	1.3	+	Protrusive
12	47	31	G II	1.6	1.6	+	Protrusive
13	47	41	G II	1.6	1.6	+	Protrusive
14	55	31	G II	2	1.5	+	Protrusive
15	55	41	G II	2	1.5	+	Protrusive
16	62	41	G III	2	2	+	Protrusive
17	62	42	G III	2	2	+	Protrusive
18	46	31	G III	2.1	1.7	+	Centric
19	46	41	G III	2.1	1.7	+	centric
20	60	41	G II	1.9	2	+	Protrusive

21	60	25	G III	1.9	2	+	Protrusive
22	60	12	G III	1.3	0.4	+	Centric
23	44	31	G III	2.9	1.6	+	Centric
24	44	41	G III	2.9	1.6	+	Centric
25	44	47	G III	1.8	1.5	+	Protrusive
26	44	32	G III	1.2	1	+	Protrusive
27	44	42	G III	1.2	1	+	Protrusive
28	45	41	G III	1.5	1.2	+	Protrusive
29	45	21	G III	1.5	1.2	+	Protrusive
30	45	21	G III	1.3	2.4	+	Centric
31	45	41	G III	1.3	2.4	+	Centric
32	39	41	G II	2	1.2	+	Protrusive
33	39	42	G II	2	1.2	+	Protrusive
34	63	32	G III	1.1	1.3	+	Protrusive
35	63	41	G III	1.1	1.3	+	Protrusive
36	60	21	G II	1.2	0.9	+	Protrusive
37	41	41	G III	2.7	3	+	Centric
38	41	31	G III	2.7	3	+	Centric

Trauma from occlusion clinical attachment loss (5↑)???







It is a positive correlation (Trauma from occlusion is associated with Clinical attachment loss).

When trauma exist, there is more clinical attachment loss.

The age range of participants ranged from 36: 63 years (Table 1).

Trauma from occlusion was defected at least 2 teeth in each patient, and accordingly 38 were diagnosed as having signs of TFO were included in the study.

Trauma from occlusion was detected in anterior teeth and fremitus was detected mostly in protrusive movement. (Table 1).

Detection of symptoms of trauma from occlusion was found to be in ascending order when correlated with clinical attachment loss (Figure 1 & 2). More traumatized teeth were accompanied by mostly in teeth with stage III periodontitis (Figure 3).

Both plaque and bleeding indices were showed increasing severity with advanced age. This was comparable with clinical attachment loss.

DISCUSSION

Results of the present study revealed that teeth with signs of injury as manifested by fremitus, vertical cervical angular defect and irregular widening of periodontal membrane space were detected in lower anterior teeth with protrusive movement of the mandible. This was totally seen in central and lateral incisors. This result could be supported by study by Sreekuman et al, 2012 that reported only 26% of studied population revealed disclusion of anterior teeth

during protrusive mandibular movement. This could mean that the rest had contact during this movement. The same study showed presence of disclusion in canine in 60% of their cases in centric occlusion, proving cuspid guidance. This is in accordance with the present study, since no prematurity or signs of trauma was detected in canines.

Injury in anterior teeth with excessive occlusal force may be a result of discrepancies between centric occlusion and centric relation (Wang et al, 1994 and Stephen et al, 2009).

On the other hand, detected trauma from occlusion more in posterior teeth, and was correlated with severity of periodontal breakdown (Zhou et al, 2017). This may be due to higher age group participated in the present study (mean 53.3) while in Zhou study the mean was 48.

Results also, showed that trauma from occlusion was more prevalent in teeth with stage III periodontitis, with CAL more than 5 mm.

This result is comparable with Harrel & Nunn, 2009, who found multiple types of occlusal contacts with increased probing pocket depth. Also, Branschofsky et al., 2011, reported correlation between detected traumatic occlusion and severity of periodontal disease.

Study limitations: small sample size and use of articulating paper in detection of occlusal prematurities.

CONCLUSION

Within the limitation of the study it can be concluded that: Trauma from occlusion is associated with more attachment loss.

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