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Original article

Influence of adhesives usage in complete dentures during adaptation period varying the degree of resorption of mandibular ridges

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ABSTRACT

Purpose: This study evaluated the effect of the use of a powder-type adhesive on masticatory performance and oral health related quality of life (OHRQoL) in patients with normal and resorbed mandibular ridges during adaptation period with complete dentures.

Methods: Forty-two edentulous subjects (12 men, 30 women) were distributed in four groups: normal mandibular ridges with adhesive, n = 10; normal mandibular ridges without adhesive, n = 10; resorbed mandibular ridges with adhesive, n = 11; resorbed mandibular ridges without adhesive, n = 11. Masticatory performance was evaluated by sieving method and OHRQoL by Oral Health Impact Profile in Edentulous Adults (OHIP-EDENT) inventory at 30, 60 and 90 days after the insertion of new complete dentures. Data were analyzed using 2-way ANOVA test and Generalized Estimating Equations (GEEs), $\alpha = 0.05$.

Results: The use of adhesive resulted in better masticatory performance at 30 ($35.76 \pm 12.63\%$) and 60 days ($30.06 \pm 10.54\%$) after the insertion of the dentures and did not influence on OHRQoL in participants with normal ridges during the adaptation period. The use of adhesive did not interfere on masticatory performance during adaptation period and had a negative effect on masticatory discomfort/disability subscale OHRQoL at 30-day period [5.2(3.6, 6.8)] for resorbed mandibular ridges with new complete dentures.

Conclusions: The use of adhesive can improve masticatory performance of new complete dentures users with normal mandibular ridges in the initial adaptation period up to 60 days after insertion. For resorbed ridges subjects, the use of adhesive had a negative impact on masticatory discomfort/disability OHRQoL at 30 days after insertion.

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1. Introduction

Adaptation period with new conventional complete dentures is considered crucial for the success of treatment. During this period several problems are usually reported by denture wearers. These common problems are pain and need for adjustments under mandibular dentures even after 3 months [1], difficulty to eat with new dentures in 3-month adaptation period [2], masticatory dysfunction, lack of coordination of mandibular movements, excessive salivary flow and phonetic problems [3]. However, the

use of adhesives has proven to be effective in solving some problems in this period [4,5].

Denture adhesives like powders and creams are often used by complete denture wearers, but powder was more economic accessible, especially in the Brazilian population [6], showed low cytotoxic potential in *in vitro* tests using human gingival keratinocytes [7] and was more easily removed from the acrylic resin surfaces than the cream type adhesives during oral hygiene performed by denture wearers [8].

Few studies evaluated the influence of denture adhesive use during the adaptation period with conventional complete dentures [5,9–12], especially in patients with different degrees of mandibular ridge resorption [5]. Only one study considered the degree of mandibular ridge resorption in the evaluation of adhesive use during a short follow-up period with complete dentures and only subjective variables were evaluated [5].

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Therefore, it was considered relevant to evaluate the effect of use of denture adhesive during the adaptation period with new complete dentures in participants with different degrees of mandibular ridge resorption, in order to produce more conclusive results.

The aim of the present study was to evaluate the effect of the use of a denture adhesive on masticatory performance and oral health related quality of life (OHRQoL) of edentulous patients with normal and resorbed mandibular ridges during adaptation period with new conventional complete dentures. The null hypothesis was that adhesive use would not influence the masticatory performance and OHRQoL of edentulous patients with normal and resorbed mandibular ridges, independently of the follow-up period.

2. Material and methods

The present study was carried out with due appreciation and approval of the Human Research Ethics Committee of the Araraquara Dental School-UNESP (CAAE: 67699617.4.0000.5416) and was registered in Brazilian registry of clinical trials database (www.ensaiosclinicos.gov.br), Identifier: RBR-6qr863. Participants were enrolled among patients of the Araraquara Dental School-UNESP from June 2017 to June 2018.

2.1. Patients' selection

Potential subjects received new conventional complete dentures with the same characteristics regarding clinical and laboratorial procedures for their confection. The same dental technician fabricated all the dentures using 33-degree cusp angle acrylic resin teeth (Trubyte Biotone; Dentsply Industry and Commerce Ltd, Rio de Janeiro, RJ, Brazil). All patients were instructed verbally and by means of an explanatory leaflet that includes guidelines related to adaptation period with new dentures and instructions for their hygiene [13] and removal of the dentures during the nocturnal sleep [14]. Patients who agreed to participate in this study were selected by inclusion criteria: need for complete dentures replacement; older than 45 years; receptive individuals; good understanding of spoken Portuguese; mandibular ridges considered normal or resorbed by Kapur [15] adapted by Gonçalves et al. [16,17] in order to be distributed in study groups: normal ridge subjects with adhesive, normal ridge subjects without adhesive, resorbed ridge subjects with adhesive, resorbed ridge subjects without adhesive [15,16]; normal salivary flow (secretion of unstimulated saliva of 0.3–0.4 mL/min) [18]; no previous adhesive use; previous experience with complete dentures and edentulism for at least one year. Participants who presented debilitating systemic conditions, signs and/or self-reported symptoms of temporomandibular disorders (muscular pain or limitation of mandibular movements) were excluded.

Patients distribution in groups according to mandibular ridge resorption was based on the classification described by Kapur [15] and adapted by Gonçalves et al. [16,17]. According to Kapur's Index [15] the mandibular ridges are scored according to the ridge shape, tissue resiliency and location of border tissue attachment. All volunteers were classified according to these scores, in order to standardize the participants with normal (total score >7) or resorbed mandibular ridges (total score <7) [16,17].

The classification of complete dentures after insertion was performed according to the Kapur's Index [15] for retention and stability. The dentures can be classified as "poor" (total score <6), "fair" (total score between ≥6 and ≤8) and "good" (total score >8) for retention and stability. The individuals who classified with

poor bimaxillary complete denture were excluded from this study. The same researcher, a prosthodontic, evaluated all the mandibular ridges and complete dentures regarding the Kapur indexes [15].

2.2. Study design

Participants were evaluated for masticatory performance and OHRQoL in different adaptation periods (30 days, 60 days and 90 days after the insertion of new complete dentures) based on previous studies that evaluated adaptation periods for complete dentures [1,9,10,19]. Subjects were instructed to use Corega powder (Corega, GlaxoSmithKline, Rio de Janeiro, RJ, Brazil) for a total period of 3 months, without pauses, in the experimental groups normal ridge subjects with adhesive and resorbed ridge subjects with adhesive according to the manufacturer's instructions on the mandibular denture in daytime. Recalls appointments were scheduled, for the participants for adjustments of their complete dentures, if necessary.

2.3. Masticatory performance

On the evaluation days, all the participants (groups with and without adhesive, normal and resorbed mandibular ridges) were instructed to chew in a usual way five almonds for 20 masticatory cycles [20]. For the participants within the groups with adhesive, Corega powder was applied 20 min before the masticatory tests [16]. The chewed product was collected, filtered, dehydrated and sent for laboratory analysis by a blind researcher. The total material weight (Wt) was weighed in a precision scale (Industria e Comércio Eletro-Eletrônica Gehaka Ltda, São Paulo, SP, Brazil). Then, the sieve method was used under constant vibration for 60 s in a 4-sieve series with square apertures 4.0 mm, 2.8 mm, 2.0 mm and 1.0 mm (Granutest®, Telastem Sieves for Analysis Ltda, São Paulo, SP, Brazil). The masticatory performance (MP) was calculated in percentage based on the weight of the material retained in sieves 2.0, 1.0 mm and collector (W1), as follow: $MP = W1 \times 100/Wt$ [21].

2.4. Oral health related quality of life (OHRQoL)

The subjects OHRQoL with new complete dentures were evaluated by Oral Health Impact Profile in Edentulous Adults (OHIP-EDENT) inventory. Brazilian version of OHIP-EDENT was validated by Souza et al. [22]. This inventory consists of 19 items grouped according to four subscales/domains: oral pain/discomfort, masticatory discomfort/disability, psychological discomfort/disability and social disability [23]. From the answers, average scores from 0 to 38 are generated for each experimental situation and lower scores representing higher OHRQoL in complete denture users. The same researcher applied this inventory in the different moments of the research.

2.5. Sample size

This study considered the summary results of OHRQoL (primary outcome) from 20 subjects. A sample calculation was performed and it was estimated that 10 participants are needed per group so that it is possible to detect differences in the OHRQoL between the groups ($\alpha = 0.05$, power = 0.80). The sample size is in agreement with previous studies, performed under similar conditions [10,11,15,16,19,20,24–27].

2.6. Statistical analysis

Analyses considered two variation factors: interventions (adhesive use or not) and follow-up time (30, 60 and 90 days

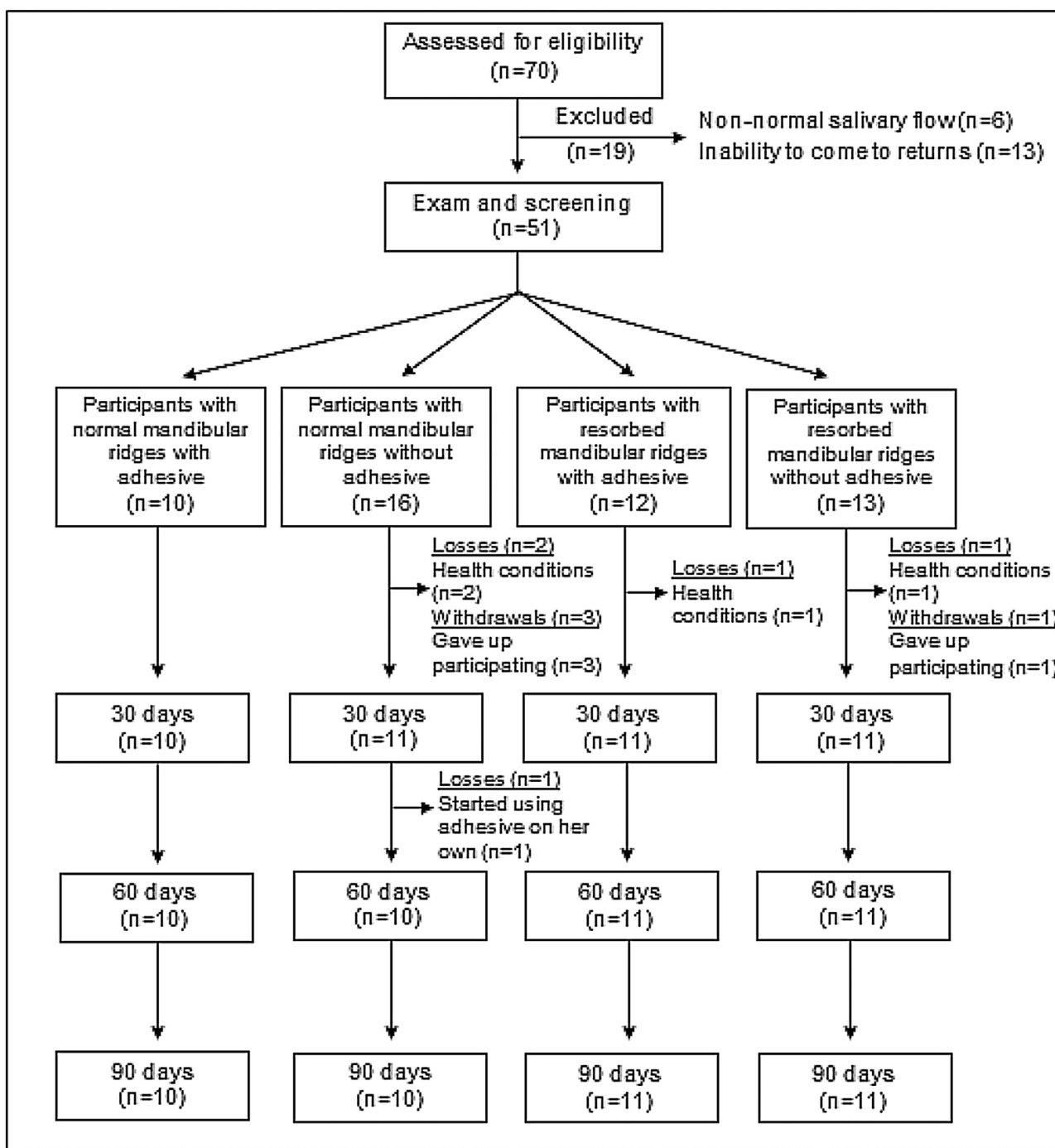


Fig. 1. Flow diagram of participants throughout the study adapted from CONSORT.

after insertion). The data obtained for masticatory performance had adherence to normality by Shapiro-Wilk test ($p > 0.05$) and sphericity by Mauchly test ($p > 0.05$) of averages variances obtained, the 2-way ANOVA test was adopted for data analysis. Generalized estimating equations (GEEs) method was used for the evaluation of OHRQoL because OHIP-EDENT summary scores and results for most satisfaction items did not present homogeneous variances. Multiple comparisons were performed by the Bonferroni post hoc test to identify differences within each significant interaction between factors. Statistical analysis was performed using SPSS for Windows (version 15.0; SPSS Inc.), with $\alpha = 0.05$.

3. Results

Seventy potential subjects (18 men, 52 women) were examined and screened according to the inclusion and exclusion criteria. Fifty one (14 men, 37 women) were distributed into four groups according to the mandibular ridge resorption classified by Kapur index [15,16]. Eight participants were lost before 30-day period, five in normal ridge subject without adhesive group for health conditions and withdrawal from the study, one in resorbed ridge with adhesive group due to health conditions, and two in resorbed ridge without adhesive group due to health

Table 1. Sociodemographic factors of participants with normal and resorbed mandibular ridges, with or without use of adhesive.

Sociodemographic factors	Normal with adhesive		Normal without adhesive		Resorbed with adhesive		Resorbed without adhesive	
	n	%	n	%	n	%	n	%
1. Sex								
Male	4	40.0	3	30.0	2	18.2	3	27.3
Female	6	60.0	7	70.0	9	81.8	8	72.7
2. Age								
49-62	2	20.0	2	20.0	2	18.2	3	27.3
62-75	4	40.0	8	80.0	8	72.7	5	45.4
75-88	4	40.0	-	-	1	9.1	3	27.3
3. Salivary flow (mL/min)								
0.3-0.8	6	60.0	10	100.0	11	100	10	90.9
0.8-1.4	3	30.0	-	-	-	-	-	-
1.4-2.0	-	-	-	-	-	-	1	9.1
2.0-2.5	1	10.0	-	-	-	-	-	-
4. Edentulism time (years)								
1-10	1	10.0	4	40.0	1	9.1	3	27.3
10-20	3	30.0	2	20.0	2	18.2	2	18.2
20-30	3	30.0	1	10.0	2	18.2	1	9.1
30-40	1	10.0	2	20.0	1	9.1	2	18.2
40-50	2	20.0	1	10.0	5	45.4	3	27.3
5. Systemic diseases								
None	2	20.0	3	30.0	2	18.2	1	9.1
Cardiovascular	6	60.0	4	40.0	7	63.6	6	54.5
Gastrointestinal	1	10.0	-	-	2	18.2	1	9.1
Skeletal/muscle	4	40.0	2	20.0	4	36.4	3	27.3
Immunological	-	-	1	10.0	-	-	-	-
Hematological	1	10.0	-	-	-	-	2	18.2
Endocrine	5	50.0	4	40.0	6	54.5	7	63.6
Respiratory	-	-	-	-	1	9.1	1	9.1
Infectious disease	1	10.0	1	10.0	-	-	-	-
Neurological/psychiatric	3	30.0	3	30.0	1	9.1	1	9.1
6. Score of Kapur index for mandibular ridge resorption								
3	-	-	-	-	2	18.2	2	18.2
4	-	-	-	-	6	54.5	4	36.4
5	-	-	-	-	1	9.1	1	9.1
6	-	-	-	-	2	18.2	4	36.4
7	6	60.0	4	40.0	-	-	-	-
8	3	30.0	5	50.0	-	-	-	-
9	1	10.0	1	10.0	-	-	-	-
10	-	-	-	-	-	-	-	-
7. Score of Kapur index for complete dentures retention and stability								
6	1	10.0	2	20.0	1	9.1	6	54.5
7	2	20.0	1	10.0	5	45.4	3	27.3
8	1	10.0	2	20.0	3	27.3	1	9.1
9	1	10.0	1	10.0	1	9.1	1	9.1
10	5	50.0	4	40.0	1	9.1	-	-

conditions, and one participant was lost before 60-day period in the normal ridge without adhesive group, for starting use adhesive on her own. Forty-two individuals completed the entire study (Fig. 1). Table 1 shows the sociodemographic factors of the participants.

3.1. Masticatory performance

The 2-way ANOVA test showed that for participants with normal mandibular ridges the factor intervention was significant (p=0.020) and there was a significant effect of follow-up time (p=0.009) as well as the interaction between the factors intervention and follow-up time (p=0.008) (Table 2). The Bonferroni post hoc test demonstrated that the masticatory performance of participants with normal mandibular ridges using adhesive was greater in periods of 30 (35.76 ± 12.63%) and 60 days (30.06 ± 10.54%) in comparison to 30 (21.35 ± 9.05%) and 60 days (18.45 ± 6.38%) of normal mandibular ridges participants without

Table 2. Two-way ANOVA of masticatory performance for participants with normal mandibular ridges.

Source of variation	SS	Df	MS	F	P
Intervention (use of adhesive)	1325.395	1	1325.395	6.531	0.020 [*]
Follow-up time	393.940	2	196.970	5.355	0.009 [*]
Intervention × follow-up time	410.081	2	205.041	5.574	0.008 [*]
Error	1324.242	36	36.784		

^{*} Significant difference (P < 0.05).

adhesive. In addition, the periods of 30 and 60 days had a higher masticatory performance in the participants with normal mandibular ridge that used adhesive in relation to the period of 90 days (23.53 ± 9.74%) (Fig. 2). For participants with resorbed mandibular ridges the 2-way ANOVA showed no significance for the intervention, follow-up time and interaction between the intervention and follow-up time (Table 3, Fig. 3).

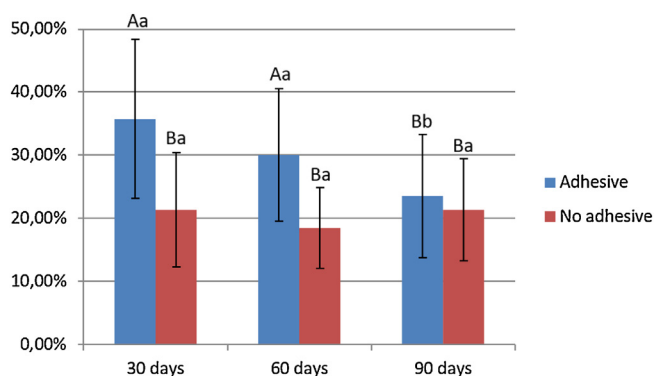


Fig. 2. Comparison of mean values for masticatory performance of participants with normal mandibular ridges (Bonferroni, $P < 0.05$). Different capital letters indicate statistically significant differences between intervention (adhesive or no adhesive); similar lowercase letters indicate similarity between follow-up periods.

Table 3. Two-way ANOVA of masticatory performance for participants with resorbed mandibular ridges.

Source of variation	SS	Df	MS	F	P
Intervention (use of adhesive)	11.807	1.000	11.807	1.321	0.264 ^{ns}
Follow-up time	12.622	1.370	9.213	1.796	0.191 ^{ns}
Intervention × follow-up time	5.712	1.370	4.169	0.813	0.412 ^{ns}
Error	140.573	327.402	5.130		

No significant difference = ns.

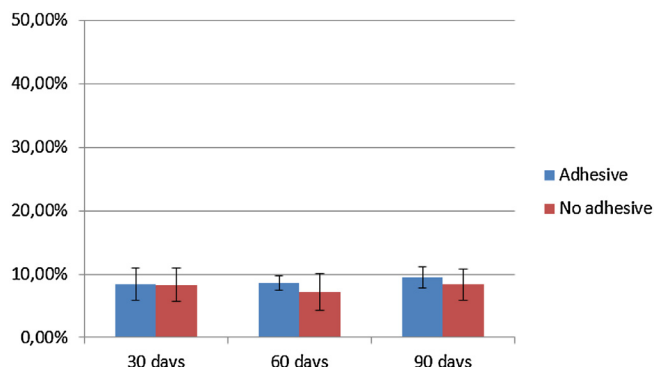


Fig. 3. Mean values and standard deviations for masticatory performance of participants with resorbed mandibular ridges (2-way ANOVA, $P > 0.05$).

3.2. Oral health related quality of life (OHRQoL)

The generalized estimation equations (GEEs) test showed that for participants with normal mandibular ridges there was a significant effect of follow-up time for domains/subscales 1 ($p < 0.001$) and 4 ($p = 0.006$) and for the general score of OHRQoL ($p = 0.006$) (Table 4). For participants with resorbed mandibular ridges there was a significant effect of follow-up time for 1 ($p < 0.001$) and 4 ($p = 0.008$) subscales. Furthermore, there was a significant difference in the interaction between intervention and follow-up time factors for 1 ($p = 0.004$) subscale. The Bonferroni post hoc test demonstrated that in 1 (masticatory discomfort/disability) subscale for participants with resorbed mandibular ridges using adhesive the OHRQoL was lower in the period of 30 days [5.2(3.6, 6.8)] compared to the 30-day period of participants with resorbed mandibular ridges without adhesive [2.9(1.8, 4.1)]. In addition, in the same domain, 30-day period had a lower

OHRQoL for participants with resorbed mandibular ridge using adhesive [5.2(3.6, 6.8)] compared to the 60 [2.6(0.9, 4.3)] and 90 days [1.7(0.2, 3.2)] (Table 5).

4. Discussion

The null hypothesis of the present study was rejected since the use of a powder-type adhesive influenced on the outcomes (masticatory performance and OHRQoL).

In this study, the use of the adhesive resulted in a significant improvement of masticatory performance only for participants with normal mandibular ridges at 30 and 60 days after the insertion of complete dentures. Masticatory performance had a significant decrease for these subjects at 90-day follow-up period in relation to previous periods, which became similar to the normal mandibular ridges group without adhesive. This increase in masticatory performance at 30 and 60-day periods for participants with normal mandibular ridges using adhesive could be attributed to a better self-confidence and OHRQoL detected in previous studies, assessed through specific inventories like Geriatric Oral Health Assessment Index [5,10]. However, in this study, OHRQoL was assessed through OHIP-EDENT inventory and no significant effect was observed for participants with normal mandibular ridges using adhesive during adaptation period. Thus, it could be reasonable to admit that the improvement on masticatory performance observed in this study for participants with normal mandibular ridges who used adhesive may be related to the pattern of mandibular movements during chewing of these subjects. It was observed in a previous study [16] that complete denture wearers with normal mandibular support area who used adhesive exhibited a reduction in mouth opening time during chewing, which probably corroborates to the increase of masticatory function.

The use of adhesive in this study had no influence on masticatory performance and resulted on a lower OHRQoL for masticatory discomfort/disability subscale at 30-day period for participants with resorbed mandibular ridges. In contrast, Koronis et al. [5] showed that the use of three cushion adhesives in the period of two consecutive days after the insertion of new complete dentures resulted on the self-reported improvement of masticatory ability for participants with resorbed mandibular ridges, compared to complete dentures wearers with normal mandibular ridges. From our results, it could be assumed that the use of the adhesive only impairs the retention of the mandibular dentures, and had no influence on their stability. The stability of a denture, described as the resistance that complete dentures offer against forces that are applied to it in the horizontal or rotational sense [28], depends of the support tissues, specially the degree of resorption of the ridges. Thus, the non-influence of adhesive use on masticatory performance of participants with resorbed ridges could be attributed to their unfavorable prognosis, which eventually impairs the stabilization of the mandibular complete dentures, compared to the participants with normal ridges. In addition, tongue strength that make it difficult to stabilize the mandibular denture during chewing [28]. Complete denture wearers with resorbed mandibular ridges usually have a reduced masticatory function compared to larger support area subjects [29]. Gonçalves et al. [17] observed that complete denture wearers with resorbed mandibular ridges performed fewer lateral movements during mastication, which resulted in a lower masticatory performance. Occasionally, resorbed alveolar bone can be replaced by fibrous connective tissue covering resorbed ridges that's become thinner and friable, making chewing more painful and limited occlusal strength, which may have a direct impact on patients masticatory performance and chewing ability [27,30–32].

Table 4. Summary OHRQoL means scores (95% confidence intervals) for participants with normal mandibular ridges.

Item: intervention	30 days	60 days	90 days	Mean	GEE, <i>P</i> value		
					Intervention	Time	Interaction
Summary score							
Adhesive	6.8(2.9, 10.7)	2.8(−0.0, 5.6)	2.5(−0.3, 5.3)	4.0(1.1, 6.9)	0.331	0.006*	0.114
No adhesive	7.6(4.3, 10.9)	6.5(2.5, 10.5)	4.9(0.5, 9.3)	6.3(2.7, 9.9)			
Mean	7.2(4.7, 9.8) a	4.7(2.2, 7.1) b	3.7(1.1, 6.3) c				
D1. Masticatory discomfort/disability							
Adhesive	2.9(1.3, 4.5)	1.0(−0.5, 2.5)	0.9(−0.4, 2.2)	1.6(0.3, 2.9)	0.297	<0.001*	0.250
No adhesive	4.0(2.4, 5.6)	2.5(0.6, 4.5)	1.8(−0.2, 3.8)	2.8(1.0, 4.5)			
Mean	3.5(2.3, 4.6) a	1.8(0.5, 3.0) b	1.4(0.2, 2.5) c				
D2. Psychological discomfort/disability							
Adhesive	0.6(0.1, 1.1)	0.2(−0.2, 0.6)	0.2(−0.2, 0.6)	0.3(−0.0, 0.7)	0.196	0.390	0.461
No adhesive	0.8(−0.1, 1.7)	1.1(0.0, 2.2)	1.5(−0.5, 3.5)	1.1(−0.0, 2.3)			
Média	0.7(0.2, 1.2)	0.7(0.1, 1.2)	0.9(−0.2, 1.9)				
D3. Social disability							
Adhesive	0.0(0.0, 0.0)	0.0(0.0, 0.0)	0.0(0.0, 0.0)	0.0(0.0, 0.0)	0.189	0.114	0.114
No adhesive	0.1(−0.1, 0.3)	0.3(−0.1, 0.7)	0.1(−0.1, 0.3)	0.2(−0.1, 0.4)			
Mean	0.1(−0.0, 0.1)	0.2(−0.1, 0.4)	0.1(−0.0, 0.1)				
D4. Oral pain/discomfort							
Adhesive	3.3(1.2, 5.5)	1.6(0.5, 2.7)	1.4(0.3, 2.6)	2.1(0.8, 3.4)	0.836	0.006*	0.111
No adhesive	2.7(1.4, 4.0)	2.6(1.5, 3.7)	1.5(0.8, 2.3)	2.3(1.4, 3.2)			
Mean	3.0(1.7, 4.3) a	2.1(1.3, 2.9) a	1.5(0.8, 2.1) b				

Lowercase letters in columns indicate similarity.

* Significant difference ($P < 0.05$).**Table 5.** Summary OHRQoL means scores (95% confidence intervals) for participants with resorbed mandibular ridges.

Item: intervention	30 days	60 days	90 days	Mean	GEE, <i>p</i> value		
					Intervention	Time	Interaction
Summary score							
Adhesive	11.9(7.0, 16.8)	8.8(3.3, 14.4)	6.7(0.9, 12.6)	9.2(4.4, 13.9)	0.408	0.060	0.342
No adhesive	7.5(5.0, 9.9)	8.0(5.2, 10.8)	5.3(1.9, 8.6)	6.9(4.6, 9.2)			
Mean	9.7(7.0, 12.4)	8.4(5.3, 11.5)	6.0(2.6, 9.4)				
D1. Masticatory discomfort/disability							
Adhesive	5.2(3.6, 6.8) aB	2.6(0.9, 4.3) bA	1.7(0.2, 3.2) bA	3.2(1.8, 4.6)	0.612	<0.001*	0.004*
No adhesive	2.9(1.8, 4.1) aA	3.3(1.7, 4.8) aA	2.0(0.8, 3.2) aA	2.7(1.7, 3.8)			
Mean	4.0(3.0, 5.0)	3.0(1.8, 4.1)	1.9(0.9, 2.8)				
D2. Psychological discomfort/disability							
Adhesive	2.6(0.9, 4.4)	1.6(0.0, 3.1)	1.4(−0.2, 2.9)	1.9(0.5, 3.2)	0.134	0.219	0.069
No adhesive	0.6(0.2, 1.1)	1.2(0.3, 2.1)	0.4(−0.2, 0.9)	0.7(0.2, 1.3)			
Mean	1.6(0.8, 2.5)	1.4(0.5, 2.2)	0.9(0.1, 1.7)				
D3. Social disability							
Adhesive	0.8(0.0, 1.6)	0.7(−0.0, 1.5)	0.6(−0.6, 1.8)	0.7(−0.0, 1.5)	0.138	0.860	0.918
No adhesive	0.2(−0.1, 0.4)	0.1(−0.1, 0.3)	0.2(−0.1, 0.4)	0.2(0.0, 0.3)			
Mean	0.5(0.1, 0.9)	0.4(0.0, 0.8)	0.4(−0.2, 1.0)				
D4. Oral pain/discomfort							
Adhesive	5.7(3.8, 7.7)	3.9(2.0, 5.8)	3.0(0.9, 5.1)	4.2(2.4, 6.1)	0.418	0.008*	0.137
No adhesive	3.7(2.3, 5.1)	3.5(1.9, 5.0)	2.7(1.0, 4.5)	3.3(2.1, 4.5)			
Mean	4.7(3.5, 5.9) a	3.7(2.5, 4.9) b	2.9(1.5, 4.2) b				

Different capital letters in line indicate statistically significant differences; similar lowercase letters in columns indicate similarity.

* Significant difference ($P < 0.05$).

The adaptation period with complete dentures in this study was established within 90 days after the insertion of complete dentures, in accordance with a previous study [9]. Farias-Neto and Carreiro [1] showed no difference in overall patient satisfaction and masticatory efficiency between 3 and 6 months after the insertion of complete dentures. Thus, it could be hypothesized that the period of 90 days using adhesive was sufficient to promote a better neuromuscular and psychological integration to new conventional complete denture users [10]. However, it has been admitted that up to six months after new complete dentures

insertion, patients may have experience with pain and discomfort due to slow mandibular bone remodeling and adaptation of posterior supporting tissues to denture insertion [1], which may interfere with masticatory performance tests and OHRQoL.

One possible limitation of our results is the fact that the degree of resorption of the mandibular ridge is not the only factor related to masticatory function. Edentulism period, mandible body length [30], patient's experience with old dentures, mental attitude towards treatment, age and neuromuscular coordination [31] may be determinants on masticatory function. Others factors may have

influenced the masticatory function and OHRQoL to all the participants, like adhesive taste and unpleasant consistency [6] and muscular complex conditioning, hypersalivation, oral sterogenesis, pain and discomfort during adaptation period [1,3].

Another limitation was that only one type and one brand of adhesive was used in this study (Corega powder). Previous studies have shown advantages in terms of accessibility [6], ease of removal [8] and lack of cytotoxicity [7] for powder-type denture adhesives. However, this adhesive type can provide a lower retention [33,34] than cream adhesives used in most studies that evaluate masticatory function [10,15,16,20,24–26,35–37]. It could be also hypothesized that cream-type adhesives better distribute the masticatory forces to supporting tissues because of their “cushion” property such as strips [38], while powder-type adhesives probably lacks this impact-absorbing property affecting the masticatory function mainly for participants with resorbed mandibular ridge. Another point is the fact that, in this study, the participants were instructed to apply the powder adhesive on the inner surface of the dentures following the manufacturer’s recommendations and according to the researcher performance demonstrated to them. However, the quantity of powder/liquid is not well established following the manufacturer’s recommendations neither described in previous studies [20,33,34]. Thus, in this study, we considered that the powder/liquid ratio used by the participants should be enough to promote the minimum retention and stability to their mandibular dentures, according to their self-perception, which may have been greater or lesser than necessary to establish adhesion strength, possibly influencing the results.

More studies are needed to evaluate the influence of adhesive use during the adaptation period with new bimaxillary complete dentures. The present study disagree with some previous evidence regarding adhesive use on masticatory function and OHRQoL during this period [5,10]. However, other studies agree that after the adaptation period with new dentures the adhesive can improve masticatory function and OHRQoL of normal and resorbed mandibular ridges subjects [16,20,24,25,27,35,37]. Moreover, despite the contraindication of adhesive use in old and/or ill-fitting complete dentures [4,39] some studies have shown that adhesive use provided a better retention and stability of old and ill-fitting complete dentures [11,12].

Our results are consistent to admit that the use of adhesive in adaptation period with new complete dentures does not have a positive impact on masticatory performance and OHRQoL of individuals with resorbed mandibular ridges. In addition, it is interesting to note that OHRQoL of the study participants was influenced by the follow-up time and not by the use of adhesive. Thus, our data suggest that, after the insertion of new complete dentures, the follow-up time (adaptation period) is crucial for the good performance of studied outcomes, which are not influenced in this period by the use or not of adhesive.

This study could contribute to the clinical practice of dentists since the results allow deducing that the use of Corega powder in the adaptation period with conventional complete dentures can benefit complete denture wearers with normal mandibular ridges and has no effect in patients with resorbed mandibular ridges. Still, this research has data to suggest that the indication of adhesive in the adaptation period does not have a positive impact on OHRQoL, especially for patients with resorbed mandibular ridges.

5. Conclusion

Within the limitations of the present study, it was concluded that adhesive use can improve masticatory performance of new complete denture users with normal mandibular ridges at 30 and 60-day periods after the insertion but had no influence on

masticatory performance of resorbed mandibular ridges. Adhesive use had a negative influence on masticatory discomfort/disability subscale OHRQoL of resorbed mandibular ridges participants at 30-day period after the insertion of complete dentures but had no effect on the OHRQoL of normal mandibular ridges subjects. The indication of adhesives during adaptation period does not have a positive impact on OHRQoL, especially for patients with resorbed mandibular ridges.

Declaration of interest statement

None.

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