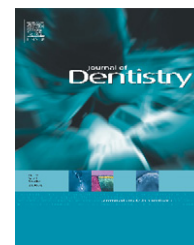


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A randomised trial on simplified and conventional methods for complete denture fabrication: Masticatory performance and ability[☆]

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ABSTRACT

Objectives: To compare a simplified method to a conventional protocol for complete denture fabrication regarding masticatory performance and ability.

Methods: A sample was formed by edentulous patients requesting treatment with maxillary and mandibular complete dentures. Participants were randomly divided into two groups: Group S, which received dentures fabricated by a simplified method, and Group C ($n = 21$ each), which received conventionally fabricated dentures. After three months following insertion, masticatory performance was evaluated by a colorimetric assay based on chewing two capsules as test food during twenty and forty cycles. Masticatory ability was assessed by a questionnaire with binary answers and a single question answered by means of a 0–10 scale. A third group (DN) formed by seventeen dentate volunteers served as an external comparator. Groups were compared by statistical tests suitable for data distribution ($\alpha = 0.05$).

Results: Thirty-nine participants were assessed for three months (twenty from Group C and nineteen from Group S). Groups C and S presented similar masticatory performance which corresponded to approximately 30% of Group DN. Results for masticatory ability showed similarity between S and C, regardless of the assessment method, although an isolate questionnaire item showed more favourable results for the first group.

Conclusions: The simplified method for complete denture fabrication is able to restore masticatory function to a level comparable to a conventional protocol, both physiologically and according to patient's perceptions.

Clinical significance: Although masticatory function is impaired by the loss of natural teeth and dentures can restore only a fraction of such function, patients can benefit from a simplified protocol for complete denture fabrication to the same extent they would by conventional techniques.

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1. Introduction

Complete edentulism is an important public health problem, mainly among the elderly.¹ Although dental literature reports a declining prevalence of this condition in some developed countries, there is still a large number of subjects needing prosthodontic treatment worldwide. Moreover, such number tends to remain considerable for several decades.^{2,3} Another critical aspect is that edentulous patients tend to present worse socioeconomic conditions, with income showing sound correlation with tooth loss.⁴

Complete dentures are the most common treatment for edentulous patients,^{1,5-8} although denture wearers usually complain of discomfort and difficulties to chew hard foods.⁹ Even if implant-retained prostheses can overcome those limitation thus improving oral function and patient satisfaction,^{1,5} several patients do not accept or cannot undergo implant insertion. Higher costs also make implant treatment restrictive in several cases.

Conventional protocols for complete denture fabrication as accepted in regions such as North America¹⁰ involve a broad series of clinical and laboratory procedures.¹¹ However, there is some questioning about the need of some procedures due to the lack of evidence that dentures fabricated by complex protocols are more successful.¹² This lack of evidence has led some clinicians to employ simpler procedures.¹³⁻¹⁵

Owen⁶ supports minimal protocols for denture fabrication in agreement with prosthetic and functional standards. Such protocols would lead to masticatory function restoration, aesthetics and quality of life by appropriate technologies based on effective but minimally expensive materials and procedures. Some retrospective studies and case series have supported such viewpoint.¹⁶⁻²¹ However, the most recommended studies to answer such controversies regarding the effectiveness of oral rehabilitative modalities are the randomised controlled trials and systematic reviews.^{15,22} We have searched the PubMed database for such studies by the following strategy: (overdenture or ((removable or complete) and denture)) and ((techni* or fabricat* or simpl* or tradition*) or (impression* or oclus* or (facebow or face-bow) or remount* or adjust*)) and (((randomized controlled trial [pt]) or (controlled clinical trial [pt]) or (randomized [tiab]) or (placebo [tiab]) or (drug theaas py [sh]) or (randomly [tiab]) or (trial [tiab]) or (groups [tiab])) and (humans [mh])). Despite a yield of 496 titles and abstracts on April 08th 2012, there were only two reports of parallel arm randomised trials^{2,23} and two crossover studies^{8,17} comparing simplified complete denture fabrication methods with conventional techniques. In summary, those studies report no better result for conventionally fabricated dentures in terms of patient satisfaction^{2,8,17} and denture quality.² As expected, simplified methods resulted in lower direct and indirect costs.²³

Despite the existence of the above mentioned studies, the comparative evidence regarding denture fabrication methods is still scarce,²⁴ e.g. trials consider a limited set of outcomes. One of the main goals of oral health interventions is to preserve or rehabilitate functional parameters, mainly mastication,²⁵⁻²⁷ which is one of the most important roles of the stomatognathic system.^{28,29} Thus, an important limitation in

the current evidence is the absence of comparative studies dealing with simplified denture wearers' masticatory function.

There are two main approaches for the assessment of mastication i.e. by clinically measuring the comminution of test food (masticatory performance and efficiency) or by inquiring the patient perception of his/her own chewing (masticatory ability).³⁰ The association of both approaches has been advocated for clinical studies as a manner to consider objectively small differences between treatment modalities without overlooking functional adaptation and relevant psychological aspects.³¹

Simplified protocols for denture fabrication should not further impair mastication when compared with conventional methods. Although no denture fabrication method can reach the masticatory performance found in dentate subjects,^{30,32-34} it is important to determine whether a minimum number of clinical procedures is able to restore masticatory function as conventionally obtained dentures do. Therefore we aimed to compare a simplified technique for complete denture fabrication with a conventional technique by a randomised controlled trial considering masticatory performance and ability as outcomes. Two groups of edentulous, adult patients were evaluated three months after denture insertion and compared with a third group of dentate volunteers as an external parameter of unspoiled masticatory functions. The null hypothesis of this study was that there would be no difference in masticatory performance or ability among the three groups.

2. Materials and methods

This paper reports part of the results from a randomised trial with two parallel arms comparing a simplified protocol for complete denture fabrication to a conventional method (ClinicalTrials.gov identifier: NCT01230320). Both the trial protocol and dentate participants addition were approved by the institutional Ethics Committee. Participants were informed about the investigation nature and enrolled after written informed consent.

2.1. Participants

Trial participants were edentulous patients who requested treatment at the clinics of Ribeirão Preto Dental School and were enrolled from October 2010 to April 2011. Inclusion criteria comprised: (a) age over forty-five years; (b) complete edentulism for at least one year; (c) desire to receive a pair of new conventional complete dentures; (d) mental receptiveness; and (e) good understanding of spoken Portuguese. Exclusion criteria comprised: (a) disorders of the masticatory system disorders; (b) pathological changes of residual ridges; and (c) debilitating systemic diseases.

We enrolled dentate participants (Group DN) among the staff of Ribeirão Preto Dental School, according to the following inclusion criteria: (a) age over forty-five years; (b) complete natural dentition, except for restorations or missing third molars; (c) no previous orthodontic treatment; (d) not using any medication that affects muscular activity; and (e) good understanding of spoken Portuguese. Specific exclusion

criteria were: (a) signs or symptoms of temporomandibular disorders; (b) occlusal trauma; and (c) periodontal disease.

After informed consent, participants provided information regarding demographic aspects. Moreover, each edentulous participant received a score according to the classification system for complete edentulism of the American College of Prosthodontists (ACP).³⁵

2.2. Interventions

Edentulous participants were randomly allocated to two groups and received new complete dentures fabricated according to a simplified (Group S) or conventional method (Group C). In summary, differences between the tested interventions involved the impression technique, use of a facebow and denture try-in stage.

Group C participants received dentures fabricated according to clinical and laboratory procedures similar to those used in previous studies.^{2,8,23} A preliminary impression was obtained by using irreversible hydrocolloid (Jeltrate, Dentsply Ind. e Com. Ltda., Petrópolis, RJ, Brazil) in stainless steel stock trays. Trays were previously augmented with warm utility wax strips (Wilson, Polidental Indústria e Comércio Ltda., Cotia, SP, Brazil) and shaped by tongue movements and manipulation of labial and buccal soft tissues. Zinc oxide–eugenol paste final impressions were obtained³⁶ and maxillomandibular relationships were recorded.³⁷ The position of the maxillary rim was transferred to a semi-adjustable articulator by a facebow. The articulator was set to an average setting, i.e. 30° and 15° for the sagittal and lateral condylar inclinations, respectively.^{15,17} Dentures received anatomic teeth with cuspal inclination of 33° set according to a balanced articulation. Group C underwent two denture try-in appointments: one after anterior teeth arrangement and a second one following posteriors arrangement. Patients received their dentures at the sixth appointment, immediately after adjustments and instructions regarding hygiene and maintenance.^{16,38,39} They attended at least three post-insertion appointments at the first, seventh and fourteenth days following denture delivery and received base or occlusal adjustments when needed. Further appointments were scheduled as necessary until the participant presented no discomfort or signs of mucosal trauma.³⁸

Group S participants underwent a single impression appointment, during which a pair of irreversible hydrocolloid impressions was obtained as described for Group C. Definitive casts were obtained from such impressions, and record bases fabricated according to anatomic landmarks.¹⁶ Most procedures for maxillomandibular relationship record were similar to Group C, except for the absence of a facebow transfer. Adjusted maxillary rims were aligned symmetrically with a 15° angle on a flat occlusal plane indicator.¹⁵ A single denture try-in was carried out following anterior and posterior teeth arrangements.¹⁶ Although denture insertion and post-insertion appointments were similar in both groups, the simplified protocol resulted in new dentures after four clinical appointments.

Two dentists performed the clinical procedures on denture fabrication for both groups. The same professionals conducted laboratory steps under supervision of a dental technician.

2.3. Sequence generation

Edentulous participants were allocated according to a sequence of computer-generated random numbers (allocation ratio: 1:1). A researcher who was not involved with other parts of the trial prepared and secured the sequence code, which was transferred to sealed, opaque envelopes. An envelope was opened for each participant only after the first appointment, i.e. after obtaining a first pair of casts. This was done in order to ensure that the first series of impressions would be similar for Groups C and S.

2.4. Masticatory performance

Masticatory performance was assessed by a colorimetric method based on an artificial test food. The test food consists of a rectangular polyvinyl acetate capsule containing fuchsin beads (250 mg) (Fig. 1A). The capsules remain closed during mastication, whereas the beads comminution is proportional to masticatory performance.²⁸

Participants sat upright in a chair with their feet on the ground for testing purpose. A preliminary step was chewing a hyperboloid silicone-based test food for thirty seconds, in order to get the participants adapted to the test protocol (Fig. 1B).⁴⁰ After three minutes, participants chewed a capsule for twenty cycles under a researcher's supervision who was blind for the assigned interventions. After another three-minute interval, participants chewed other capsule for forty cycles.⁴¹

Chewed capsules were opened and their content was dissolved in distilled water. The resulting solution was filtered and the fuchsin concentration ($\mu\text{g/mL}$) was quantified by a spectrophotometer. Such concentration corresponds to the masticatory performance.⁴¹

2.5. Masticatory ability

We employed two approaches in order to assess the masticatory ability. An assessment was performed by a five-question instrument (MA questionnaire) that considered participants' daily experience with feeding without changing his/her habits due to problems with dentures and difficulties to chew hard foods.⁴² Participants with favourable answers for three or more questions had their masticatory ability classified as favourable. Items (1) and (3) pose questions regarding

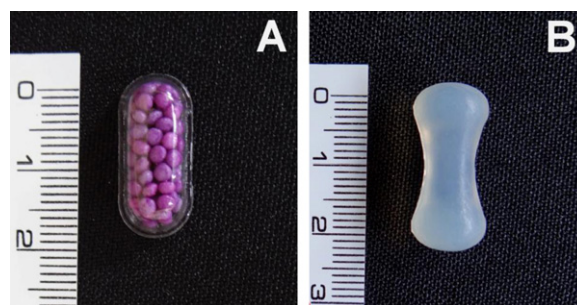


Fig. 1 – Test foods used in the masticatory performance assessment (A) capsule containing fuchsin beads; (B) hyperboloid test food.

problems with dentures; therefore, that term was changed to “dentition” for Group DN.

The second assessment approach for masticatory ability consisted of asking participants to grade their ability to chew food according to a 0–10 numeric scale (from “not at all satisfied” to “totally satisfied”). A grade higher than seven was considered as an indication of favourable masticatory ability.⁴³

2.6. Statistical analyses

The concentration of fuchsine released within the capsules ($\mu\text{g/mL}$) according to groups and number of cycles was evaluated by the generalised estimating equations method (GEE) with an identity link function. An exchangeable working correlation was assumed and generalised score statistics was used instead of Wald tests. Groups and cycles were inserted as categorical variables and multiple comparisons done by the Bonferroni test.

Each of the five items of the MA questionnaire generated a binary outcome, which was compared by means of χ^2 tests. Summary scores for the MA questionnaire ranged from 0 to 5 by counting the number of favourable answers and were compared by the Mann–Whitney test, considering only the two arms of the trial. The 0–10 scores for the three groups were compared by the Kruskal–Wallis test.

We considered the assessment of complete cases when participants were lost due to reasons that were obviously independent of the study protocol. When there was doubt about such independence or withdrawals and losses clearly associated with the protocol, we performed the worst-case

scenario analysis described by Jadad and Enkin.⁴⁴ In other words, the highest result observed was inputted for the group with the lowest mean value or the lowest value for the group with highest mean value. Then statistical assessment was redone by this approach and discrepant results would be discussed as bias evidence led by missing participants.

All statistical tests were performed by the SPSS Statistics software (v.17; SPSS Inc., Chicago, IL, USA). The level of significance for most test was set at a 0.05, whereas multiple comparisons employed Bonferroni correction ($\alpha = 0.0167$). The tests were performed by a blind data analyst for the study groups.

3. Results

3.1. Participants

Seventy-two patients of Ribeirão Preto Dental School were screened for possible enrolment. Among the forty-two randomised patients, two were lost before the three months follow-up (both in Group S) and one from Group C abandoned the protocol before receiving post-insertion adjustments. The latter participant was considered for worst-case scenario analysis. All remaining participants ($n = 39$) underwent outcome assessment at three months following insertion. Fig. 2 presents a flow diagram of enrolled participants in the trial.

Table 1 presents demographic characteristics of the three study groups. Study groups presented different mean ages, with similar values for Groups C and S and significantly lower age for Group DN (Tukey HSD test). The two groups which

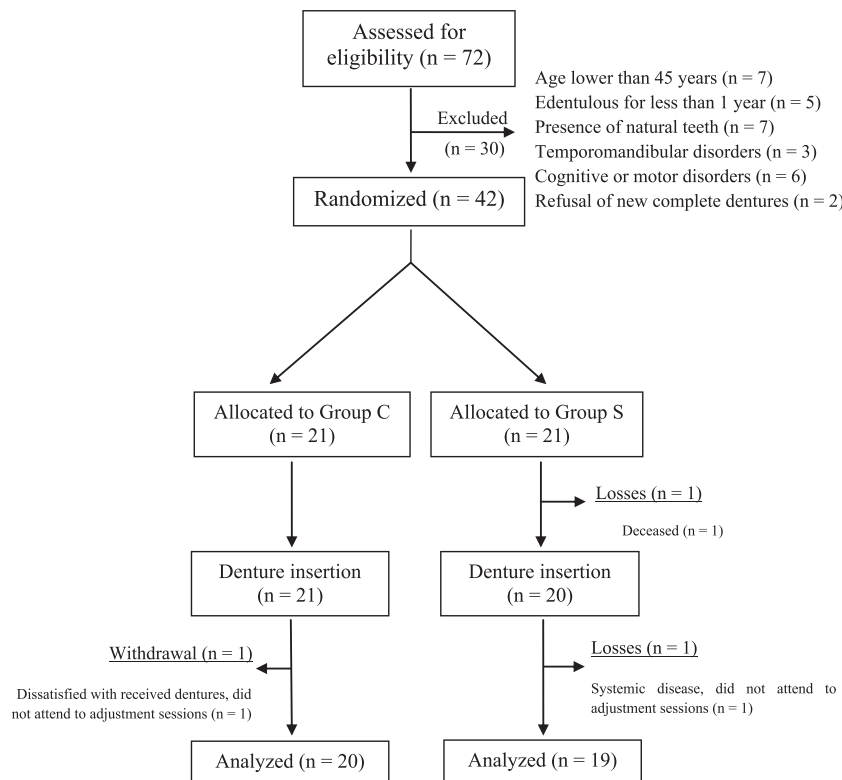


Fig. 2 – Flow diagram of participants through the trial.

Table 1 – Demographic characteristics of participants.

	Group		DN	P value
	C	S		
Age (years) [†]	64.7 ± 9.1	66.5 ± 7.4	51.4 ± 5.8	<0.001 ^a
Gender (n)				
Female	11	10	9	0.987 ^b
Male	9	9	8	
Edentulism (years) [†]	20.1 ± 16.9	25.0 ± 11.8	–	0.150 ^a
Previous complete denture wearers (n)				
Maxillary denture wearing	15	16	–	0.476 ^b
Mandibular denture wearing	12	16	–	0.093 ^b
Professional activity (n)				
Retired	12	12	1	0.001 ^b
Pensioner	2	1	0	
Homemaker	2	2	1	
Unemployed	0	0	0	
Employed/autonomous worker	4	4	15	
Education (n)				
Illiterate	4	1	0	<0.001 ^c
Incomplete primary school	14	13	0	
Complete primary school	1	2	0	
Incomplete high school	0	1	0	
Complete high school	1	1	8	
Incomplete university education	0	1	0	
University education graduate	0	0	9	
Marital status (n)				
Married	8	11	17	0.003 ^b
Single	0	2	0	
Divorced	5	1	0	
Widowed	7	4	0	
Cohabiting	0	1	0	
ACP classification				
I	1	1	–	0.722 ^d
II	7	7	–	
III	4	5	–	
IV	8	6	–	

[†] Mean ± standard deviation.

^a Data compared by one-way ANOVA.

^b Data compared by χ^2 .

^c Data compared by Kruskal–Wallis test.

^d Data compared by Mann–Whitney test.

received prosthodontic therapy were similar in terms of previous denture wearing and case complexity as shown by the ACP classification. Despite the gender similarity for the three groups, they presented differences regarding other demographic characteristics.

3.2. Masticatory performance

Fig. 3 presents mean fuchsine concentration ($\mu\text{g}/\text{mL}$) released after chewing for twenty and forty cycles according to the groups. Dentate participants show higher mean values than complete denture wearers, regardless of the cycle number. No marked difference can be observed in association with denture fabrication techniques within each number of cycles.

The analysis of complete cases by GEE confirmed that masticatory performance shows significant influence from different study groups ($P < 0.001$) and number of chewing

cycles ($P < 0.001$). The interaction between such factors was not significant though ($P = 0.228$), implying that differences among groups are independent of the cycle number. The worst-case scenario analysis did not result in different P values for groups or number of cycles, and the same conclusion can be drawn for factorial interaction ($P = 0.192$).

Estimated mean fuchsine concentration and respective 95% confidence intervals (CI) according to groups and regardless of the cycle number were: C = 0.35 (0.24–0.47); S = 0.33 (0.23–0.42); and DN = 1.07 (0.95–1.18). Values obtained for both groups of edentulous patients did not present significant difference, although they were different of dentate participants. The average masticatory performance found for groups C and S represented 33% and 31% of the results found with complete natural dentition, respectively.

Regardless of the groups, mean fuchsine concentrations (CI) were 0.48 (0.41–0.55) and 0.68 (0.61–0.76) for twenty and forty chewing cycles, respectively. Such significant difference

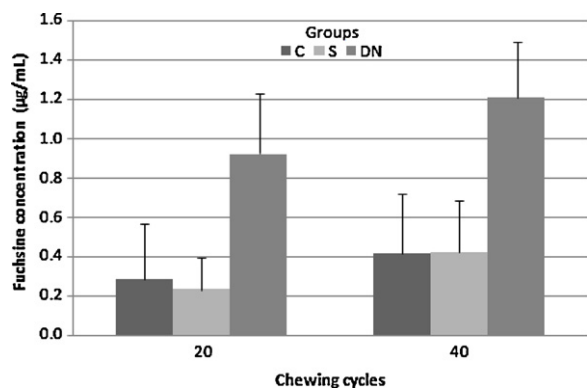


Fig. 3 – Mean fuchsin concentration released following mastication of test capsules according to the groups and number of chewing cycles. Error bars represent standard deviations.

shows that forty cycles result in higher mean values for the three tested groups.

3.3. Masticatory ability

Table 2 presents answers to the five questions on masticatory ability. Data for Group DN were omitted from Table 2, since all dentate participants provided the same answer (favourable answers to every question). Such result shows an evident difference between dentate subjects and complete denture wearers also from the patient viewpoint; therefore, we carried out inferential analysis by comparing the groups of edentulous participants only.

Nearly half of the edentulous participants treated conventionally pointed out some difficulty with feeding (Q1), whereas a significantly lower number was found for Group S. This suggests that simplified dentures were able to help easier feeding than a conventional treatment protocol. Such differences were not found for other questions though. At any rate, none of the groups of denture wearers presented 100% satisfactory answers for each of the MA questionnaire items (Table 2).

Two participants from Group S and eight from Group C presented unsatisfactory masticatory ability according to the MA questionnaire (Fig. 4). Therefore, the relative risk of an unsatisfactory masticatory ability as a result of the simplified technique was 0.34 (CI: 0.10–1.22). A comparison between groups treated with complete dentures by means of the Mann–Whitney test did not find significant differences for summary scores either ($P = 0.120$).

When considering the withdrawn participant, P values were nearly similar to those obtained by means of complete cases for single questions (Table 2) and summary scores ($P = 0.161$).

Fig. 5 presents results of masticatory ability assessment by a visual 10-point scale for the three study groups. Sixteen participants of each group of denture wearers were within such interval, as well as 100% of Group DN. Nevertheless, differences among groups were not significant (Kruskal–Wallis test, $P = 0.699$). As for other outcomes, worst-case scenario analysis showed no influence of the single withdrawal in Group C (Kruskal–Wallis test, $P = 0.777$).

4. Discussion

This study found that edentulous patients treated by simplified or conventional methods had similar masticatory performance. The similarity between groups on the tested clinician-reported outcome shows that simplified denture fabrication does not lead to further masticatory impairment. It has been widely stated that adequate impression procedures are critical for oral function, denture retention and health of supporting tissues.⁴⁵ Such statement has supported complex impression techniques and the use of specific impression materials. Nevertheless, present findings reveal that, at least for masticatory function, a single impression was able to result in appropriate complete dentures. The similar results for masticatory performance in both trial arms also agree with previous statements that a facebow transfer is not advantageous for denture fabrication.^{2,5,8,17}

As expected, dentate participants presented better masticatory performance³⁴ since complete dentures are not able to

Table 2 – Answers to the MA questionnaire according to the denture fabrication methods tested.

Questions	Answers	Group		Total	P (χ^2 test)	
		Conventional (n = 20)	Simplified (n = 19)		Complete cases	WCS [†]
Q1 (eating well)	No (0)	8	2	10	0.035*	0.044*
	Yes (1)	12	17	29		
Q2 (ability to chew anything)	No (0)	8	3	11	0.093	0.115
	Yes (1)	12	16	28		
Q3 (changes in feeding)	Yes (0)	6	2	8	0.132	0.154
	No (1)	14	17	31		
Q4 (able to chew hard foods)	No (0)	10	5	15	0.129	0.165
	Yes (1)	10	14	24		
Q5 (needs a soft diet)	Yes (0)	7	3	10	0.170	0.201
	No (1)	13	16	29		

* Significant difference ($P < 0.05$).

† Worst case scenario analysis done by inputting a “1” for each question.

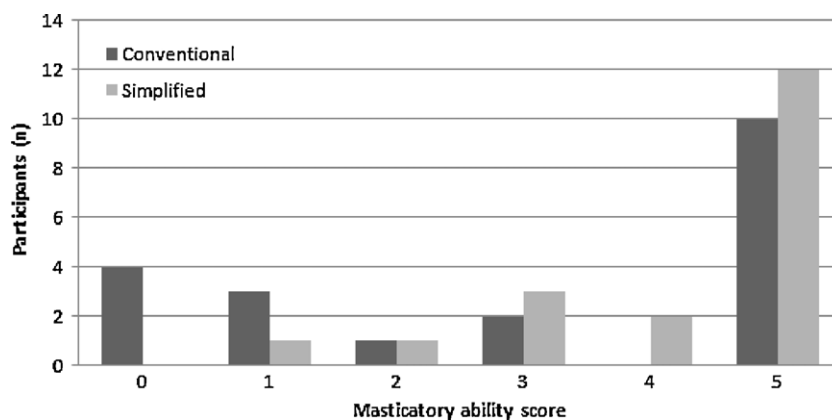


Fig. 4 – Summary scores for the MA questionnaire.

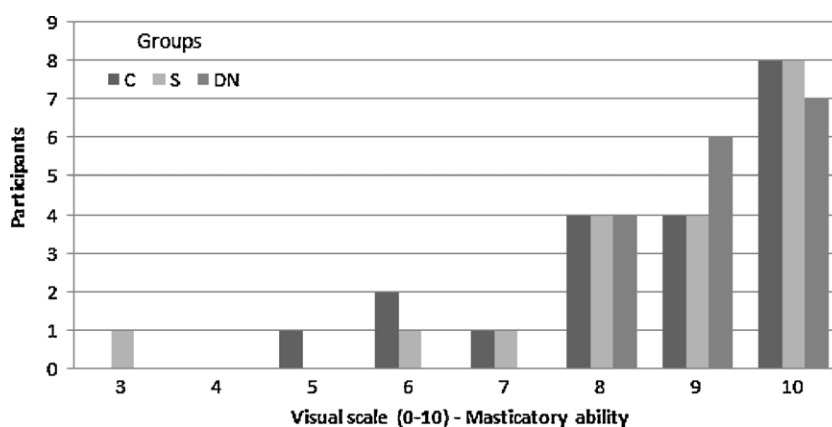


Fig. 5 – Masticatory ability assessed according to a 0–10 visual scale.

fully restore lost masticatory function. Complete denture wearing can be considered as an impairing condition for several patients even if prosthetic appliances are clinically adequate.⁴⁶ We found that denture wearers presented nearly 30% of the masticatory performance of dentate subjects. Although previous studies describe some varying percentages for the same comparison, they are about to present findings. While Manly and Braley³² and Yamashita et al.⁴⁷ described a 40% and 33.3% masticatory performance respectively, values as low as 5%⁴⁸ were also found. The latter value may be associated with small sample sizes or discrepancies between edentulous and dentate groups, i.e. wide age differences. This study applied a different method for masticatory performance assessment when compared with previous reports, which used sieving methods. The choice of the colorimetric method took into account its reliability and validity associated with its uncomplicated use in a clinical setting.^{28,49}

The number of chewing cycles influenced results of masticatory performance for the three groups, with better comminution after forty cycles. Complete denture wearers may achieve improved masticatory performance if instructed to chew for longer periods as for dentate subjects. Present results confirm that denture wearers need more cycles in

order to comminute food, since their performance after forty cycles was still lower than that for dentate subjects at twenty cycles.²⁶

In terms of masticatory ability, both trial arms presented similar results regardless the method. Most edentulous patients evaluated their mastication favourably, in clear contrast with their low masticatory performance. Patient self-evaluation tends to be optimistic compared with the assessment made by a clinician, as commonly found for complete denture wearers.^{49,50}

Only one among the MA questionnaire items showed differences between trial arms, with better feeding reported by Group S. Such an unexpected finding reflects the influence of different fabrication methods. A possible reason for that is the use of a zinc oxide–eugenol paste, which was previously reported to be associated with lower patient satisfaction when compared with other final impression materials.⁵¹ Other aspects such as choice of foods and mastication itself are not influenced by denture fabrication methods, nor masticatory ability as a whole. The low prevalence of unfavourable answers can be explained by variable patients' capability for adapting to impaired masticatory performance. Yet, such capability often compensates just partially for tooth loss.

We excluded dentate subjects from the comparison on the MA questionnaire due to the remarkable roof effect found. Despite this important limitation, the MA questionnaire was able to achieve its goal in this study – to compare different groups and observe differences when applicable. This was highlighted by the difference between Groups S and C detected for the first item. Nonetheless, the 0–10 scale was not able to discriminate results among the three tested groups. Such finding was not expected due to the well established difference between dentate subjects and denture wearers for masticatory function. The scale was therefore considered as inadequate to discriminate among different clinical conditions but that limitation was overcome using the MA questionnaire.

A significant limitation in this study is well represented by the possibility of biases when comparing groups. This is unlikely significant for the comparison between Groups C and S, which are arms of a randomised trial and underwent an adequate, concealed allocation sequence and blinding whenever applicable. That can be reinforced by the balance found regarding every demographic and clinical characteristics of such groups. On the other hand, the same was impossible when comparing Group DN with the edentulous participant. Another noteworthy issue is the possibility of withdrawals and losses that could lead to erroneous conclusions. This study found a relatively small incidence of such participants and no evidence of bias by a sensitivity analysis. Certain imbalance between dentate participants and denture wearers on some demographic characteristics was present and deserves comment. We found no difference for gender on the three groups, which is a major predictor of masticatory performance.⁴⁷ By their turn, dentate participants were younger than denture wearers despite inclusion criteria. Such limitation was practically unavoidable due to the difficulty to enrol participants aged more than sixty years whereas the prevalence of edentulism is much higher among the elderly.⁵² As a consequence, one would expect an overestimated difference between Group DN and the others. However, such overestimation may be minimal if any, since masticatory function loss associated with age is strongly associated with dentition deterioration which accumulates with ageing.⁴⁶ As an example of such statement, bite force is lower in complete denture wearers than in subjects with natural teeth regardless of age, since tooth loss is much more significant for that aspect than ageing.⁵³ Other unbalanced characteristics such as professional activities, educational level and marital status are unlikely to influence outcomes, but are probably associated with the preservation of complete natural dentition.

Although this report provides relevant data regarding the clinical performance of simplified complete dentures compared with conventionally fabricated prostheses, some outcomes still need to be reported. In future papers, we intend to present results regarding oral health-related quality of life, patient satisfaction, costs and denture quality as reported by a clinician. Future studies on use of simplified methods for fabrication of implant-retained prostheses or partial dentures may also help to establish minimum protocols able to improve patient access to oral healthcare.

5. Conclusions

Complete dentures fabricated by a simplified protocol restore masticatory performance of edentulous patients to the same extent found after using a conventional protocol. Both tested protocols resulted in a similar masticatory ability, with a slightly better result for the simplified method for easy feeding. Masticatory performance was much lower and complaints more frequent following both interventions when compared with dentate subjects though.

In summary, a simplified method for complete denture fabrication can restore masticatory function at least as well as the conventional protocol tested, from both clinician and patient viewpoints.

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Conflict of interest

There is no conflict of interest associated with this study.

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