



Empreinte secondaire en prothèse amovible partielle: enquête épidémiologique Impression techniques in Removable partial denture: epidemiological study

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RÉSUMÉ

Introduction : Différentes techniques d'empreinte peuvent être utilisées lors de la réalisation des prothèses amovibles partielles métalliques (PAPM), l'un des impératifs essentiels est l'anticipation de la dualité tissulaire et le respect des structures d'appui notamment dans le cadre des édentements terminaux

Objectif : Évaluer les pratiques des praticiens lors de la réalisation des empreintes secondaires lors des réhabilitations par PAPM et rechercher d'éventuelles corrélations entre les doléances prothétiques et le non-respect des différentes normes d'empreinte secondaire.

Méthodes : L'étude a porté sur un échantillon de dentistes exerçant dans la région de Rabat-Sale-Kenitra au Royaume du Maroc. Le questionnaire a été rempli lors d'entretiens en face à face ou par les dentistes eux-mêmes. Le questionnaire informatisé a été envoyé aux dentistes par e-mail ou via différentes plateformes de réseaux sociaux.

Une étude statistique descriptive et analytique a été réalisée pour traiter les données.

Résultats : suivant les résultats de l'étude statistique : (57,6%) utilisent seul l'alginate pour la réalisation de l'empreinte secondaire, (66%) utilisent des porte-empreintes individuels, (17%) ont recours à l'empreinte composée partielle dans la gestion des édentements terminaux mandibulaires, (77%) réalisent le remarginage dans le cadre des cl I et II de K.A. Concernant les doléances ; les praticiens qui travaillent avec plus d'un matériau d'empreinte ou ceux qui utilisent uniquement l'alginate ont rencontré une combinaison de plaintes similaires (75%).

Conclusion : Les pratiques des dentistes interrogés diffèrent de ce soit par rapport aux matériaux ou des techniques d'empreintes secondaires. On note également que les doléances exprimées par les patients sont indépendantes de la méthode utilisée. Les résultats de notre enquête concordent avec le fait que jusqu'à aujourd'hui il n'y a pas de consensus ou d'étude qui démontrent la supériorité d'une technique par rapport à une autre, ou qu'un matériau soit plus fiable pour la l'équilibre de la prothèse.

Mots clés : Techniques d'empreintes, prothèse amovible partielle métallique, pratique clinique, doléances

ABSTRACT

Introduction: Various impression techniques are used in the realization of free-end extension partial denture, one of the imperatives is to respect the compressibility and behavior of the tissue during impression making as well as during function.

Aim: To evaluate the knowledge and practices of private practitioners regarding secondary impressions made during the management of terminal edentulism with metallic removable partial denture, and to search for possible correlations between prosthetic complaints and non-compliance with the various final impression standards in terms of materials, equipment and techniques.

Methods: The study involved a sample of dentists practicing in the Rabat-Sale-Kenitra region in the Kingdom of Morocco. The paper questionnaire was filled out in face-to-face interviews or by the dentists themselves. The computerized questionnaire was sent to the dentists by e-mail or via various social network platforms.

A descriptive and analytical statistical study was carried out to treat the data.

Results: Following the results of the statistical study: (57.6%) used the alginate as a secondary impression material, (66%) used individual trays, 17% used models from primary impressions for direct prosthesis fabrication, (17%) used the cast impression technique in free end mandibular edentulous. (77%) recorded the peripheral joint in Kennedy Applegate class I and II, concerning the complaints; practitioners who worked with more than one impression material or those who use solely the alginate encountered a combination of similar complaints (75%).

Conclusion: The practices of the dentists differ in terms of materials and techniques used in the management of edentulous terminals by removable partial denture (RPD). The complaints expressed by patients were independent of the method used in the secondary impression. The results of our survey concur with the fact that until today there is no consensus to demonstrate that a technique, or a material can be more reliable for the stability and the success of the RPD.

Key words : Impression, removable partial denture, clinical practice, complaints

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INTRODUCTION

The success of a removable partial denture, the patient's comfort, the stability and especially the psychological acceptance depend on a series of essential technical factors. Undoubtedly the more delicate stage of the prosthetic technology is the transfer of information from the patient's mouth to the prosthesis through the final impression. [1,2]

The impression in complete removable denture records only soft tissue. Whereas the partial denture impression must accurately register the relatively soft, yielding tissue (the oral mucosa) at the same time that it records a hard unyielding element (the remaining teeth). The problem of achieving successful function of a Removable partial denture (RPD) then becomes one of equilibrating this resiliency differential between the relatively non-resilient periodontal ligament of the abutment tooth and the more resilient mucosa covering the residual ridge. [3,4]

In this context, the impression technique, the tray and the choice of impression material, especially in cases with distal extension, must provide a maximum support for the removable partial denture bases. It must allow for the maintenance of occlusal contact between both natural and artificial dentition and, at the same time, minimum movement of the denture base, which would create leverage on the abutment teeth. [4,5]

Various impression techniques used in the realization of free-end extension partial denture are based on theories related to the compressibility and behavior of the soft tissue during impression making and during function. [6]

So far, the main issue is that there was no support for the consensus statement implying that the two-step procedure is necessary and superior to the one-step impression method. ([7])

The question raised is if the removable partial denture made from an impression which does not satisfy this requirement will be a failure regardless of how well designed and executed it might be. On the one hand, we note that practices and choices of materials differ not only according to the clinical case but also according to the habits and requirements of each clinician and on the other hand many procedures used in prosthodontics, including the materials and methods used for removable partial denture impression, lack support of good evidence.

The objective of this cross-sectional epidemiological study is to evaluate the knowledge and practices of Moroccan private practitioners regarding secondary impressions made during the management

of terminal edentulism with removable partial denture with metal framework, and to search for possible correlations between prosthetic complaints and non-compliance with the various final impression standards in terms of materials, equipments and techniques.

METHODS

This is a descriptive and analytical cross-sectional epidemiological study conducted between May 3, 2019 and July 31, 2019 in the Rabat-Sale-Kenitra region among private sector dentists.

Design of the survey questionnaire

A thirty-three anonymous responses questions survey was developed and printed in 5 pages: 7 questions concerning the general information of the practitioner, 20 questions concerning the realization and the treatment of the secondary impressions in Removable partial denture and 6 questions about the complaints met after insertion of the prostheses.

Inclusion and exclusion criteria

The study included general practitioners practicing in the private sector in the Rabat-Sale region and listed in the official list of the Order of Dentists. Dentists practicing an exclusive specialty were excluded from the sample.

Sample

The study involved a sample of dentists practicing in the Rabat-Sale-Kenitra region. The paper questionnaire was filled out in a face-to-face interview or by the dentist himself. The computerized questionnaire was sent to the dentist by e-mail or via the various social networks.

20 questionnaires were excluded from the statistical analysis because they did not meet the inclusion criteria. The final number of questionnaires used was 100, which represented 83% of all the practices visited.

Data processing and analysis

The statistical analysis was performed using the «Statistical Package for Social Science (SPSS) version 13.0» software. The variables studied were qualitative and expressed in numbers and percentages (%) and quantitative expressed as mean standard error. The graphs were produced using Microsoft office Excel 2016.

The tests used are Chi-square test or Fisher's exact test. The difference is considered statistically significant if the p-value is less than 0.05.

RESULTS

One hundred and twenty survey responses were received from private dental practitioner. Of these, 20 were excluded because the dentists concerned have an exclusive specialty. The remaining 100 responses were analyzed

- 54% of the sample were male versus 46 (46%) were female, The age of the dentists ranged from 24 to 60 years. The study showed that the average age was 36.55 with a standard deviation of 10.40. (36,55±10,40).

- The majority of dentists surveyed had graduated from the Faculty of Dentistry in Rabat (69%) versus (14%) that had graduated from the Faculty of Dentistry in Casablanca and (17%) foreign faculties.

- 48% of the practitioners surveyed practiced in Sale, (36%) in Rabat and 16% in Temara.

- We noted a heterogeneity in the years of practice of the dentists surveyed; 47% had been practicing for more than 10 years, 11% between 5 and 10 years and 42% had been practicing for less than 5 years.

- 67.7% of the dentists (who reported the number of removable partial dentures per month) were performing less than 5 dentures per month, (10.8%) reported between 5 and 10 dentures per month, (17.2%) performed between 10 and 15 dentures per month and (4.3%) performed more than 15 dentures per month.

Equipment and materials used by practitioners

In our sample we observed that the majority of practitioners surveyed (57.6%) used alginate (irreversible hydrocolloids) alone as a secondary impression material in RPD With a lesser frequency, 3% used silicones alone for their secondary impressions, 3% used zinc oxide eugenol paste (Impression past), 2% preferred polysulfide alone and 1% used plaster as an impression material 32.3% of dentists used more than one impression material. (Figure1)

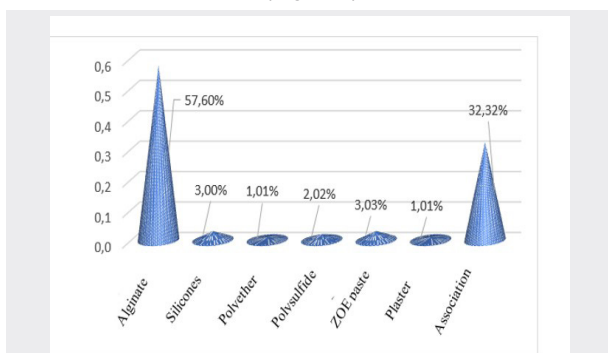


Figure 1. Impression materials used in RPD Impression techniques used by practitioners

- (77.6%) of the practitioners made a mucco-static impression for their primary impressions (15.3%) made an anatomical-functional impression with the application of muscle dynamics for their primary impressions. (7.1%) alternated between both techniques. (Figure 2)

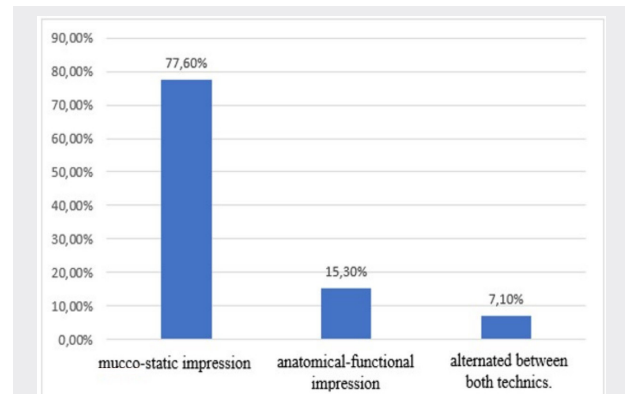


Figure 2. graphical representation of the kinds of primary impression used in RPD

- Two practitioners did not answer the question.

- (17%) of the practitioners used the primary impression as a final impression.

- (1%) of the sample were using optical impressions for the fabrication of metal partial metal partial dentures against (99%) who worked with conventional impressions

Technique of impression used for large class I, II and IV edentulism of K.A

In case of K.A. class I, II and IV edentulism, (65.7%) of the practitioners made anatomic impression technique with one stage method, (20.2%) made a single tray dual impression technic, (4%) opted for a Physiologic impression technique (3%) for a functional reline technique and (7%) used other techniques or combined more than one of the techniques listed above. (Figure 3)

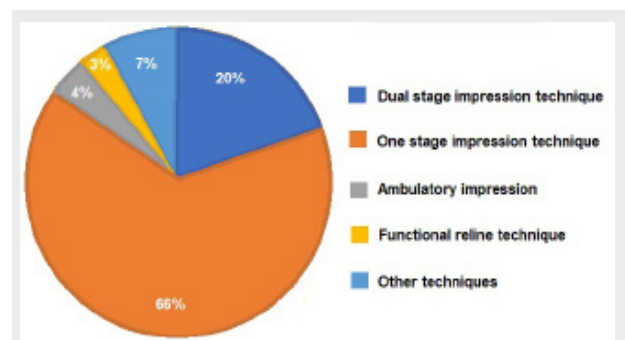


Figure 3. Type of impression used in Kennedy Applegate Class I, II and IV large edentulous situations

- One practitioner did not answer.

Border modeling in case of cl I and cl II K.A

Most of the practitioners (77%) performs a modeling of the peripheral versus (23%) of the practitioners who did not record it.

Problems encountered after prosthesis insertion

Follow up: post-prosthetic follow-up is necessary to detect complaints and guarantee prosthetic success in the medium term. (63%) of surveyed practitioners have provide a follow-up on their patients versus (37%) of practitioners who did not. Complaints: (95%) of the practitioners surveyed had complaints after prosthetic insertion

(62.1%) declared that they received a single complaint:

- (32%) injuries, (15.8%) loss of denture retention, (6.3%) problems of adaptation, (5.3%) problems of stability and (2.1%) for fractured denture teeth.

- (37.9%) of the practitioners had more than one complaint from their patients.

Impression material used according to the number of prostheses made per month (Table 1)

Practitioners who performed less than 5 prostheses per month used mostly alginate alone as an impression material (75.8%).

- Practitioners who performed between 5 and 15 prostheses per month tended to combine several materials for their impressions (65%) and used alginate alone less frequently (30%).

- The practitioners who made more than 15 prostheses per month never used alginate alone for their impressions, they either worked with Polyether alone or they associated different impression materials.

We deduced that the practitioners who made several prostheses per month used more than one type of material when making impressions compared to others; this difference is statistically significant (p=0.002).

Table 1. the use of impression materials according to the number of prostheses performed per month

	Alginate	Silicones	Polyether	Polysulfide	Paste Zoe	Plaster	More than one material	P
Less than 5 prostheses/month	75,8%	4,8%	0,0%	3,2%	3,2%	1,6%	11,3%	0,002*
Between 5 and 10 prostheses/month	30,0%	0,0%	0,0%	0,0%	10,0%	0,0%	60,0%	
Between 10 and 15 prostheses/month	31,3%	0,0%	0,0%	0,0%	0,0%	0,0%	68,%	
More than 15 prostheses/month	0,0%	0,0%	25,0%	0,0%	0,0%	0,0%	75,0%	

The type of complaints identified according to the material / impression materials, the impression technique. (Table II)

- Practitioners who used a stock tray encountered injuries (29.4%) and associations of various complaints (32.4%).

- Practitioners who used a individual impression tray also reported injuries (34%), and associations of various complaints.

On the other hand, practitioners who worked with more than one impression material encountered a combination of complaints (75%), whereas practitioners who made their

impressions with alginate encountered in (75%) only one type of complaints divided into: (39%) injuries, (18%) loss of retention of their prostheses, (10%) nonadaptation, (7%) prosthesis instability and (2%) fracture of the support teeth.

Peripheral Joint modeling

The most common complaints about the quality of the peripheral joint modeling were retention (86%), adaptation (83%) and association of complaints (80.6%), with a statistical (80.6%) and this is statistically non-significant way (p=0.71) .

Table 2. types of complaints according to the material and equipment used

	Retention	Stability	Adaptation	Injuries	Fracture of the support tooth	Association	P	
Type of tray usedh	Stock tray	6 17,6%	3 8,8%	3 8,8%	10 29,4%	1 2,9%	11 32,4%	0,77
	Individual tray	9 14,8%	2 3,3%	3 4,9%	21 34,4%	1 1,6%	25 41,0%	
Impression materials used	Alginate	10 17,9%	4 7,1%	5 8,9%	22 39,3%	1 1,8%	14 25,0%	0,41
	Elastomere		1 16,7%		3 50%	1 16,7%	1 16,7%	
	ZOE paste	1 33,3%			2 66,7%			
	Plaster	1 100,0%						
	More than one material	3 10,7%			4 14,3%		21 75,0%	

DISCUSSION

Most of the dentists surveyed graduated from the Faculty of Dentistry in Rabat. We found an heterogeneity in the length of practice between practitioners, and heterogeneity in the number of prostheses performed monthly.

The objective of the survey was to evaluate the clinical practices in terms of material and support used during impressions in management of terminal edentulous by removable partial denture. the results show that practitioners who made several prostheses per month used more than one type of material to make impressions.

The percentage of the practitioners interviewed in our study using elastomers is very low (6%) compared to that obtained in England-Ireland (35%), England-Ireland-Wales (42%) [8] and 55% according to a pilot study that analyzed impression materials processed in three dental laboratories referred by general dentists. [9]

Elastomers are described as an impression material that offers more details when reproducing small reliefs and more comfort for the practitioner during the work. However, no significant differences in clinical fit were found in a study which has analyzed the clinical fit of metal-frame partial removable dental prostheses based on custom trays used with alginate or polyvinyl siloxane impression, for post-insertion sessions with one exception: in the alginate group, four subjects reported food impaction, versus none in the polyvinyl siloxane group. [11]

Alginate as an impression material in metal stock trays seems to be acceptable for final impressions of all types of Co-Cr removable partial denture designs. [12,7]

Most of the practitioners surveyed use (66%) custom trays for final impressions, as well as in England-Ireland (2004) at an almost similar percentage (61%), and at a higher percentage in the Netherlands (84%) [8]. The majority of practitioners in England-Ireland-Wales (65%) use only commercial impression trays for their impressions. [8]

A Retrospective Clinical study has evaluated the effects of impression material, impression tray kind, and type of partial edentulism (Kennedy class) on the accuracy of fit of Co-Cr partial removable dental prostheses, it has revealed no significant correlation between tray type, or Kennedy class and the number of constructions attempts for the pooled or individual arch data ($P \geq 0.05$). [13,14]

Regarding impression techniques in distal extension removable mandibular prostheses, the altered cast impression technique has been widely adopted for decades since it allows to record independently the dento-periodontal and osteo-mucosal supports for a physiological appreciation of their future behavior under the prosthesis. [15]

Hence, the literature review indicate that the cast impression technique did not offer significant advantages over conventional single-impression techniques. The lack of convincing data to predict superiority of the altered cast impression technique for distal extension removable dental prosthesis impressions emphasizes the need for more scientific research with larger sample sizes and longer performance reviews of removable dental prostheses. [16,17]

Until today, there is no clear evidence that one technique or material has a substantial advantage over another for making removable partial dentures. Available evidence for the relative benefits of different denture fabrication techniques and final impression materials is limited and is of low or very low quality. More high-quality Randomized controlled trials are required. [18,7, 19]

This is in accordance with the results obtained from our epidemiological survey, which did not demonstrate any correlation between the impression technique, the type of impression tray and the materials used, as well as the frequency of complaints expressed by the patients or objectified by the practitioners surveyed.

CONCLUSION

The rehabilitation of terminal edentulism by partial removable prosthesis requires many steps including the secondary impression which eventually influences the balance of the prosthesis on these seating surfaces because it considers the difference in depressibility between the structures when using an individual impression tray and different materials.

However, there are no consensus to demonstrate that a technique, or a material can be more reliable for the stability and the success of the RPD.

the use of any techniques for impression can be justified when a good evaluation of the support structures is carried out, and a rigorous follow-up is installed, the complaints expressed by the patients seems inevitable but manageable during the control visits and without impact on the success and the bio functional integration of the prosthesis.

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