

Knowledge and attitude about relining of complete dentures in clinical practice: A cross-sectional study

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Abstract

Background: Residual ridge resorption is crucial sequelae of tooth loss. Complete dentures are the most common way of rehabilitating edentulous patients. However, with continuing residual ridge resorption, dentures tend to become loose and unstable causing discomfort, chewing disability, and speech problems. Denture relining is an economical means of improving a denture's stability and retention. An understanding of the clinical indications and limitations of these materials and procedures is crucial for clinical success.

Aim and Objective: The purpose of this survey was to assess knowledge, attitude, and practice in relining dentures among dental practitioners.

Materials and Methods: The cross-sectional survey was conducted using a validated questionnaire on 200 ($n = 200$) dental practitioners in Nagpur city, Maharashtra. Data analysis was done using proportion test with SPSS EPI INFO software.

Results: Although all 200 practitioners were aware of the relining procedure and were routinely carrying out the procedure in their dental clinics, 50% of the practitioners were unaware of the correct relining step by step procedure and were also not sure about the antimicrobial properties of the relining material available in the market.

Conclusion: Awareness and scientific knowledge about the relining materials and procedure should be enhanced within general dental practitioners through CDE program and workshops. Steps should be taken to include relining procedure as a part of undergraduate clinical curriculum as well as internship program.

Keywords: Antimicrobial property, complete removable denture, reliner, relining

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INTRODUCTION

Aging is a universal process and a normal inevitable biologic phenomenon. The health problems arising out of aging will have varied implications for underdeveloped, developing, and developed countries. With the increase in elderly

population, problems associated with edentulism is also on a constant rise.^[1] With a population of 4,067,637, Nagpur accounts for 4.20% of the population of Maharashtra. 8.42 percent of the district's population is over the age of 59 years. The larger the elderly population, the greater

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would be the need for social support for the elderly.^[2] With the increase of edentulism associated with elderly population, restoration and rehabilitation of the lost teeth with a dental prosthesis is the most common dental rehabilitation procedure undertaken for the elderly. The socioeconomic status of the aged population restricts the use of implant-supported prosthesis in a developing country like India. Conventional complete dentures thereby are the most commonly used dental prostheses for the elderly.^[2]

One of the main goals of complete denture construction is to achieve denture bases that best fits the underlying tissues. As residual ridge resorption occurs, dentures tend to become loose. This causes discomfort, chewing disability, difficulty in eating hard foods, and speech problems. Use of resilient liners in the clinical management of prosthodontic patients is well documented and their adjunctive benefit recognized.^[3] Since their introduction in the 1950s, these viscoelastic compliant materials have undergone some development and improvement, being used to form all or part of the fit surface of a denture and help condition traumatized tissues providing an interim or permanent cushion-like effect.^[4,5]

Various techniques such as direct chairside relining and indirect laboratory technique are available for denture relining.^[6-8] The direct chairside technique involves addition of self-cure soft relining material on the intaglio surface of the denture followed by soft-tissue molding to incorporate functional movements for correction of the fit of denture bases. Newer materials such as room temperature-vulcanizing silicone have been introduced with various antimicrobial and tissue conditioning properties. An understanding of the clinical indications and limitations of these materials and procedures is crucial for clinical success. Therefore, the purpose of this survey was to study knowledge, attitude, and practice about relining procedure among dental practitioners. Based on the results, an action plan can be developed to increase awareness and updating of knowledge among dental practitioners in Nagpur so that more scientific-based standardized procedures can be undertaken for prosthodontic rehabilitation of completely edentulous patients.

MATERIALS AND METHODS

The cross-sectional survey was conducted on a sample size of 200 private dental practitioners (62% males and 38% females) in Nagpur city, which included the general practitioners, prosthodontists, and other specialists. The sociodemographic data of the sample population are given

in Table 1. The practitioners were personally approached by the investigator, and the response rate for the study was 100%.

The survey was conducted using a self-directed, comprehensive, closed ended validated questionnaire with 16 questions [Figure 1]. This 16 item questionnaire included five knowledge-related questions [indication, technique, type of material, durability, and disinfection, Table 2], six items on practice [clinical practice, material used, technique, recall, evaluation, and instructions to the patients, Table 3], and five on attitude [Table 4], which were graded on a 5-point Likert scale (strongly agree, agree, don't know, disagree, and strongly disagree), reflecting the level of agreement of dentists' decision along the scale.

Data were imported to the IBM SPSS statistics software (IBM SPSS Inc., Chicago, IL, USA) to draw the means and percentage. The samples were also divided according to age group (25–35 years, 36–45 years, 46–55 years, and more than 55 years) and according to years of clinical practice (1–10 years, 10–20 years, and more than 20 years) [Table 1].

RESULTS

Table 2 shows the response of dentists on the basis of knowledge regarding relining of complete dentures. Seventy-four percent of dentists practicing in Nagpur region knew that relining is the procedure used to resurface the removable prosthesis whereas about 26% were not sure about the exact procedure of relining. Regarding response to a question about the preparation before relining procedure, 46% felt that thorough examination of impression surface of the denture and also the soft tissue intraorally is necessary before relining whereas 34% felt that cleaning of the dentures with an ultrasonic cleaner to remove calculus and slimy layer before relining is needed. According to 37% of the dentists, 0.5 mm from tissue surface and 1 mm from border area should be scraped from the denture before relining the denture [Figure 2]. About the duration of use of a relining material, majority of practitioners think that soft reliner should be used for short term.

Table 3 shows the attitude of the dentist about relining procedure. Eighty-one percent of the dentists think that relining increases the retention and stability of the denture whereas 14% did not feel so and 5% were not sure about it [Figure 3]. Thirty-nine percent of dentists surveyed thought relining might increase the vertical dimension of the dentures. One-fourth of surveyed dentist feels that soft reliner has adverse effects on the oral mucosa.

Thirty-five percent of practitioners did not know about the antimicrobial properties of reliner and the same percentage of practitioners disagreed with the use of antimicrobial

relining material and majority of dentist thinks that disinfection is not necessary before relining procedure.

Table 1: Sociodemographic characteristics of the study objects (n)

Variables	n (%)
Age group (years)	
25-35	44 (22)
36-45	87 (43.5)
46-55	54 (27)
>55	15 (7.5)
Gender	
Male	124 (62)
Female	76 (38)
Qualification	
General practitioner	137 (68.5)
Prosthodontists	15 (7.5)
Other specialists	48 (24)
Years of clinical experience	
1-10	123 (61.5)
11-20	58 (29)
>20	19 (9.5)

Table 4 shows practice of relining procedure. Thirty-six percent of dentists do relining when there is poor adaptation of the denture to the ridge due to excessive resorption of the residual ridge.

DISCUSSION

In the present study, the response of dentists on the basis of knowledge regarding relining of complete dentures was surveyed. It was noted that about 26% were not sure about the exact procedure of relining. Regarding response to a question about the preparation before relining procedure, 53% felt that thorough examination of impression surface of the denture and also the soft tissue intraorally is necessary before relining whereas 34% felt that cleaning of the dentures with ultrasonic cleaner to remove calculus

A Survey on Knowledge, Attitude and Practice of Relining Dentures amongst Dental Practitioners in Nagpur.

Note:-
 Tick appropriate option. Multiple options can be ticked.
 Please be assured that your identity will remain confidential. Your help and contribution is highly appreciated.

- Do you treat complete or partially edentulous patients with removable dentures?
 - Yes
 - No
- According to you, the concept of relining is?
 - Process of replacing the entire denture base material on an existing prosthesis.
 - Procedure used to resurface the tissue side of the removable dental prosthesis with new base material.
 - Both are partially correct.
 - None of the above.
- How many of your patients require relining?
 - Some of conventional complete denture patients.
 - Some of removable partial denture patients.
 - Both.
 - Only immediate denture patients.
- In your practice, what are the clinical conditions of relining?
 - When the centric occlusion of teeth is irretrievably out of harmony with centric relation.
 - When severe osseous undercuts exists.
 - When the denture base don't cover the denture foundation for adequate support.
 - When residual ridges have resorbed and adaptation of the dentures to the ridges is poor.
- Which technique do you prefer for relining?
 - Direct (chairside) method.
 - Indirect (laboratory) method.
 - Depends upon the cases.
- Disinfection should be done before relining the denture?
 - Strongly disagree.
 - Disagree.
 - Strongly agree.
 - Agree.
 - Don't know.
- What kind of preparation you would perform before relining?
 - Wipe the denture with cotton roll dipped in antiseptic solution and proceed for relining.
 - Examine the denture surface and proceed for relining.
 - Examine and assess the denture surface and soft tissues, then only proceed for relining.
 - Remove all calculus and slimy layer with ultrasonic cleaner, scrape the tissue surface and proceed for relining.
- Relining improves the stability and retention of the denture
 - Strongly disagree.
 - Disagree.
 - Strongly agree.
 - Agree.
 - Don't know.
- Relining the denture improves the patient satisfaction?
 - Strongly disagree.
 - Disagree.
 - Strongly agree.
 - Agree.
 - Don't know.
- Does relining the denture increase the vertical dimension?
 - Strongly disagree.
 - Disagree.
 - Strongly agree.
 - Agree.
 - Don't know.
- According to you, how much thickness of denture base should be scraped out
 - 2 mm from tissue surface and 2 mm from denture border area
 - 1-1.5 mm from tissue surface and 2 mm from denture border area
 - 0.5 mm from tissue surface and 1 mm from denture border area.
 - 0.5 mm from tissue surface and 0.5 mm from denture border area
- Which brand of reliner you use?
 - Soft reline, GC
 - Mollasil, PRIMEDENT
 - Permasoft, DENTSPLY
 - Viscogel, DENTSPLY
- How long relining can be given?
 - Short term.
 - Long term.
 - Both.
 - Should avoid for long term.
- In your patients, how frequently do you replace the relining materials?
 - 1 weeks
 - 1 month
 - 6 months
 - 1 year
- Could a soft reliner be harmful to the mucosa?
 - Strongly disagree.
 - Disagree.
 - Strongly agree.
 - Agree.
 - Don't know.
- Reliner with antimicrobial property should be used in every patient
 - Strongly disagree.
 - Disagree.
 - Strongly agree.
 - Agree.
 - Don't know.

Figure 1: Questionnaire used for the study

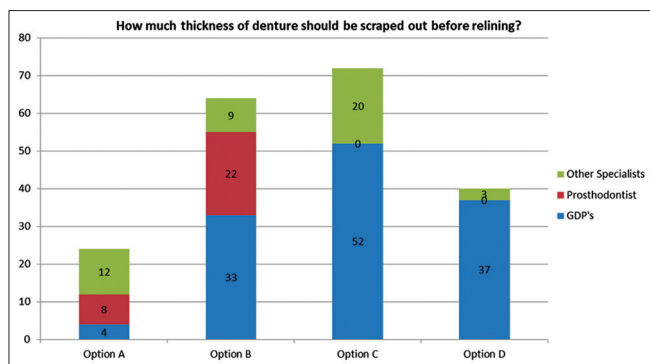


Figure 2: Response to knowledge regarding preparation of denture before relining

Table 2: Response to knowledge-based questions

Questions	n (%) of respondents (n=200)			
	Options			
	A	B	C	D
According to you, the concept of relining is	10 (5)	148 (74)	42 (21)	0
What kind of preparation you would perform before relining	20 (10)	20 (10)	92 (46)	68 (34)
How much thickness of denture base should be scraped out before relining	24 (12)	64 (32)	74 (37)	38 (19)
How long relining can be given	72 (36)	16 (8)	68 (34)	44 (22)
When should be the relining material be replaced	30 (15)	24 (12)	26 (13)	120 (60)

Table 3: Response regarding attitude of dentists regarding relining

Questions	n (%) of respondents (n=200)				
	Strongly disagree	Disagree	Don't know	Agree	Strongly agree
Relining improves the stability and retention of denture	10 (5)	18 (9)	10 (5)	128 (64)	34 (17)
Relining the denture base increases the vertical dimension	34 (17)	98 (49)	0	17 (8.5)	61 (30.5)
Soft reliner is harmful to the oral mucosa	17 (8.5)	98 (49)	68 (34)	40 (20)	4 (2)
Disinfection should be done before relining the denture	13 (6.5)	42 (21)	89 (44.5)	46 (23)	10 (5)
Reliner with antimicrobial property should be used in every patient	16 (8)	54 (27)	70 (35)	44 (22)	16 (8)
Relining the denture improves patient satisfaction	17 (8.5)	18 (9)	21 (10.5)	120 (60)	24 (12)

and slimy layer before relining procedure was needed. According to previous study by Kuncha *et al.* in 2014, on tensile bond strength of soft liners to the denture base resin with different surface preparation, sandpapering the surface of the heat-polymerized denture base as well as preparing holes on the surface of the denture base increased the bond

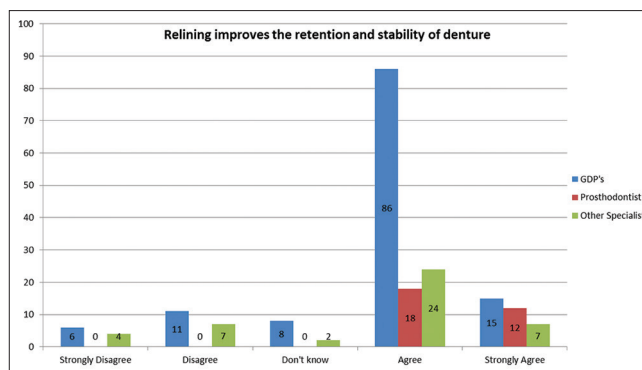


Figure 3: Response to dentist's knowledge regarding use of denture relining

strength of the soft liner due to increase in the surface area and mechanical interlocking.^[9] According to 37% of the dentists in the present survey, relief should be provided over 0.5 mm from the tissue surface and 1 mm from the border area of the denture before relining. However, according to an institution-based survey done by Nassif and Jumbelic *et al.* in 1984, about 57 dental institutions all over United States of America placed 1 mm of relief in the tissue side and 1–2 mm of border relief before the relining procedure.^[10] Clinical studies indicate that the lining layer must be of sufficient bulk (a thickness of 2 mm is recommended) to be clinically efficient.^[11-13] Babu *et al.* in 2017 conducted a prospective randomized clinical study on the effect of denture soft liner on mandibular ridge resorption in complete denture wearers after 6 and 12 months of denture insertion and concluded that the use of soft denture liner significantly reduces the residual ridge resorption in complete denture wearers as compared to conventional denture wearers (without denture liner) over a period of 1 year.^[14] Bajaj *et al.* in 2009 said that the soft liner accommodates ridge irregularities and changes such as excessive resorption, minimal keratinized ridge epithelium, and thin lamina propria and described a procedure to fabricate a metal-based denture relined with soft liner that is comfortable for the patient and is easy to adjust.^[15] These liners may be classified as provisional or definitive, room temperature and heat temperature vulcanized depending on the procedure of vulcanization.^[16-18] They are also divided into four groups according to chemical structure: plasticized acrylic resins either chemical or heat polymerized, vinyl resins, polyurethane, polyphosphazene and silicone rubbers.^[19] Clinical experience indicates almost universal tissue tolerance of soft liners and acceptable patient reactions.^[20-22] However, currently, the materials have to be considered as temporary expedients because of problems during clinical use including loss of resilience, water sorption, support of bacteria, color change, and loss of adhesion between the liner and denture base

Table 4: Response regarding practice of relining procedure

Questions	n (%) of respondents (n=200)			
	Options			
	A	B	C	D
Do you treat complete or partially edentulous patients with removable denture?	200 (100)	00		
In your practice, what are the clinical conditions require relining	14 (7)	12 (6)	54 (27)	132 (66)
Which technique do you prefer for relining?	54 (27)	98 (49)	48 (24)	-
How many of your patients require relining	10 (5)	70 (35)	100 (50)	20 (10)
Which brand of reliner you use?	52 (26)	40 (20)	48 (24)	36 (18)

resin requiring replacement at short intervals, which is time-consuming and costly for both the dentist and patient. About the duration of use of a relining material, majority of practitioners think that soft reliner should be used for short term.^[23,24] Gardner and Parr in 1988 evaluated methods of enhancing the useful lifespan of tissue conditioners, including preservation of surface integrity and viscoelasticity.^[25]

Although preserving the surface integrity of tissue conditioners may play an important role in reducing the adhesion of fungal and other microorganisms on dentures, other solutions have been suggested; these include integrating antimicrobial components such as silver zeolite into the tissue conditioner powder.^[26,27] Schneid^[28] demonstrated that a sustained release delivery system that incorporated 4 antifungal agents (chlorhexidine, clotrimazole, fluconazole, and nystatin) into a tissue conditioner (Lynal) significantly inhibited *Candida albicans* although the hardness of the tissue conditioner increased. It is possible that antimicrobial compounds could be combined with surface-coated tissue conditioners although the surface coating may prevent their release.

About 35% of practitioners did not know about the antimicrobial properties of reliner and same percentage of practitioners disagreed with the use of antimicrobial relining material and majority of dentists thought that disinfection is not necessary before relining procedure. One-fourth of surveyed dentists felt that soft liners have adverse effects on the oral mucosa. It showed that practitioners were not updated with newer materials available. It has been shown that rougher surfaces enhance the adhesion of microorganisms onto resilient lining materials and may allow fungal growth.^[29,30] The microorganisms from the plaque on the denture surface may expose patients and dental personnel to infection.^[31] In addition, denture plaque containing *C. albicans* could cause denture-induced stomatitis.^[32] Brushing alone with a soft toothbrush and

plain water does not clean the denture effectively, so use of denture cleansers is mandatory. As toothpaste causes denture roughness with time, its use is not advised for relined dentures. Chemical cleansers can be used for significant removal of accumulated denture plaque, but adequate soaking time or recommended temperature is needed for proper action.^[33] The use of antimicrobial agent prolongs the clinical longevity of resilient materials and reduces plaque accumulation.^[34] This combination may be a logical therapy in the treatment of denture stomatitis because of several factors: (1) reducing the trauma caused by the internal surface of removable dentures, (2) eliminating contact of the contaminated surface with the oral tissues and consequently interrupting the cycle of reinfection, and (3) action of antimicrobial agents incorporated into the material on the infected tissues.^[32,34] In the general dental practitioners, the responses show a negative attitude toward the procedure of relining and the correct ways to control change in vertical dimension, and maintaining health of soft tissues was not known. It might also suggest that the indications and evidence-based case selection were not very clear.

Table 4 shows practice of relining procedure. Sixty-six percent of dentists do relining when there is poor adaptation of the denture to the ridge due to excessive resorption of the residual ridge. Response to the question regarding the technique followed by the dentists for relining showed that 49% of the dentists surveyed preferred indirect method of relining whereas maximum number of prosthodontists surveyed chose direct or indirect technique depending on the cases [Figure 4]. In the study by Nassif and Jumbeli in 1984,^[10] Coe Comfort was the material of choice as a tissue conditioner whereas in the present survey, most of the dentist prefer to use soft reline (GC, America Inc.) followed by Permasoft denture reliner (Dentsply). The inconsistency in the responses and the lack of knowledge about the exact procedure for relining can be attributed to the fact that relining as a treatment procedure is not included in the undergraduate curriculum leading to doubts and confusion.

CONCLUSION

Lack of knowledge regarding advanced relining materials and their antimicrobial properties within general practitioners and improper preparatory procedure is leading to repeated failure of relined complete dentures. To improve the durability and longevity of relined complete dentures, a systematic scientific approach toward the procedure of relining is necessary, especially in patients of lower economic status, in a developing country like India, who may not be able to afford new dentures. Clinical experience indicates almost universal

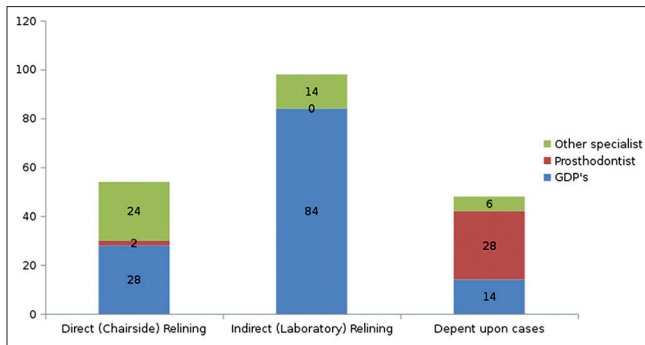


Figure 4: Response to the technique preferred by the dentists for denture relining

tissue tolerance of soft liners and acceptable patient reaction. However, currently, the materials have to be considered as temporary expedients because none of the advocated permanent liners have a life expectancy comparable to that of the resin denture base. Improved strength, permanent resiliency, improved adhesion to the denture bases, the ability to inhibit growth of microorganisms, and chemical stability continue to be the main focus of ongoing research. These attempts include surface coatings of liners with sealants such as fluorinated copolymers and integration with antifungal components. The ideal resilient denture liners would possess higher elasticity during mastication and then behave viscously to designate the functional and nonfunctional forces and relieve the pain. In addition, their durability in the oral environment is necessary over long periods. Acrylic resin which shows viscoelastic behavior and higher levels of cushioning effect may best meet the requirements for the resilient denture liners from the point of view of the inherent viscoelastic properties. However, from the standpoint of durability, the silicone would be better. Selection of a particular liner cannot be based on any single property. Material selection is influenced not only by the properties available but also by the particular clinical situation. Laboratory studies simulate an oral environment; however, no simulation is entirely accurate. The most appropriate testing environment is intraoral; consequently, clinical studies should be performed on the materials tested.

The only limitation of this study was that the sample population was restricted to Nagpur district. The same study can be carried out over the larger dentist population all over the country which will give us better insight into the practice trend followed by dental surgeon. There were no previous studies done on relining procedure survey; hence, it cannot be compared with any other studies.

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Conflicts of interest

There are no conflicts of interest.

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