Comparative study of Soft-liners and conventional acrylic hard denture in removable dentures

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Abstract:

The objective of this study was to observed patient response to the soft lined dentures. A total sixty-six (66) patients were taken in this prospective study. MOLLOPLAST- B®, a silicone based soft-lining material have been tried in 51 patients and 15 patients were treated by conventional acrylic hard denture bases. 47 patients had discomfort with their previous dentures and relined by soft-liner. 4 patients had maxillary defects and they were treated by maxillofacial prosthesis lined by soft-liner. Data were collected and analyzed using student's 't' test and 'p'-value was measured. Results showed that mean percentage of comfortness, chewing efficacy improved 45.8% and 41.2% in soft lined dentures and 30%, 15.6% in conventional method. The Molloplast – B lined dentures offered comfort to a significant number of patients in this study who had a history of chronic discomfort with wearing of conventional acrylic resin dentures. Their Masticatory function was markedly improved. Mucosa soreness was relieved cent percent in case of soft lined denture and reduce tissue irritation. Esthetics, retention and stability of dentures also improved in soft lined denture. In case of maxillofacial prostheses the problem of retentions and stability was solved by using Molloplast – B.

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Introduction:

A soft lining materials may be defined as an elastic or viscolelastic materials applied to the fitting surface of a denture for the purpose of reducing and more evenly distributing occlusal loads on the underlying oral tissues.[1] It is designed to act as a cushion between the hard denture base and soft tissues in order to reduce to masticatory forces transmitted by Prostheses to the underlying tissues.[1] On the other hand, natural teeth are attached by a periodontal ligament to the bone of the jaw and masticatory loads successfully bypass the oral mucosa and are transmitted directly to the bone. Resilient liners may be regarded as analogues of the periodontal ligament and compressible healthy mucoperiosteum in denture and edentulous persons respectively.[2]

Some investigators studied the mechanical and physical properties of soft liners while others have described their uses and manipulation. The use of Soft Denture liners has come into favour for various applications in prosthetic dentistry.[3]

It is well known that hard acrylic denture bases is an established method for the restoration of edentulous jaw, missing teeth, relining and rebasing of the denture bases. But some denture wearer suffer from discomfort with their hard dentures despite all possible adjustment. Relining or rebasing of the denture bases with hard acrylic material is time consuming and causes certain changed in the underlying tissue. Whereas dentures relined with soft liner is less time consuming, comfortable, less tissue irritant as well as improves the function. In this study soft liner is used in removal dentures for the patient betterment which justify the present study.

Materials and Methods:

The present study was a prospective type of study. The study was conducted in the department of prosthodontics, Faculty of Dentistry, Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka from January 2003 to December 2004. Study population included the patients attended in the department of prosthodontics for the treatment of the missing teeth as well as complaints of dentures. Total 66 patients were selected and treated in this study. 51 of them were selected in group I and treated with soft-lined dentures. Another 15 patients were selected in group II and treated with conventional acrylic dentures. Patients were recall

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and follow up after 2 weeks, 4 weeks, 6 weeks and 6 months to observe the condition of their prosthesis. Patient feeling on to the prosthesis and clinical findings were recorded such demographic data comfort, chewing efficiency, esthetics, phonation, soreness of mucosa, retention, stability in pre-designed data collection sheet.

Data were analyzed by using computer based programme statistical package for social science (SPPS) for windows version 12. Unpaired student 't' test were done. P value <0.05 was considered as significant.

Results:

Table-I

Age and sex distribution of the study patients (n=66)

Age in years	Study subjects				Total		p value
	Male		Female				
	No.	%	No.	%	No.	%	
<39	8	17.4	1	5.0	9	13.6	
40-49	8	17.4	9	45.0	17	25.8	
50-59	11	23.9	5	25.0	16	24.2	
60-69	10	21.7	4	20.0	14	21.2	
³70	9	19.6	1	5.0	10	15.2	
Total	46	100.0	20	100.0	66	100.0	
Mean±SD (Age in years)	55.4±14.2		52.5±10.6		54.5±13.2		0.402^{ns}

p value reached from un paired student's t test (p>0.05).
ns= not significant

Table-II

Distribution of patients by type of prosthesis worn (n=66)

Type of prosthesis	Study subjects				Total (N=66)		p value
	Group I (n=51)		Group II (n=15)				
	No.	%	No.	%	No.	%	
Complete denture	34	66.7	8	53.3	42	63.6	0.616^{ns}
Partial denture	13	25.5	5	33.3	18	27.3	
Maxillary prosthesis	4	7.8	2	13.3	6	9.1	
Total	51	100.0	15	100.0	66	100.0	

Group I= Patients treated with soft liner
Group II= Patients treated with conventional method
p value reached from chi square test (p>0.05)
ns= not significant

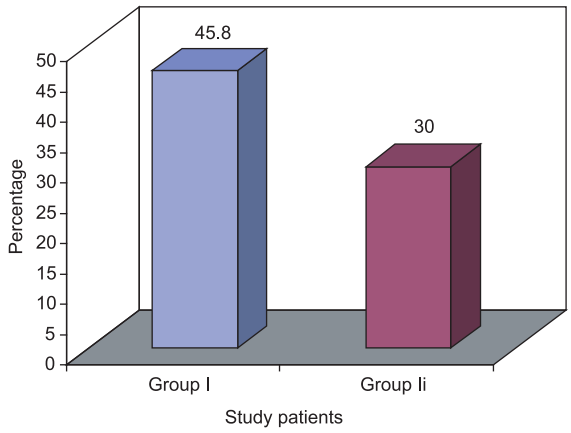

Fig.-1: *Percentage of improvement of feeling of comfortness*

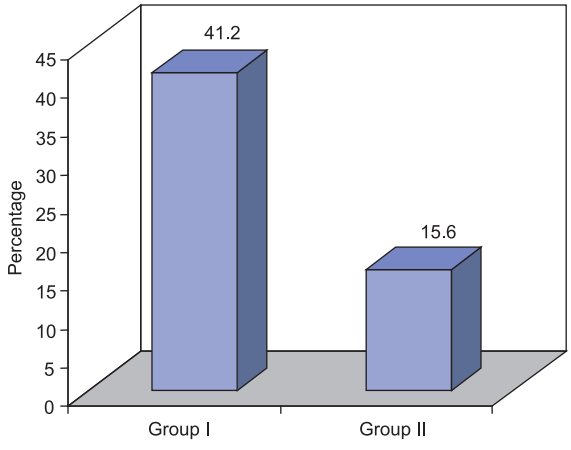

Fig.- 2: *Percentage of improvement of chewing efficiency*

Table-III

Distribution of patients by pre and post treatment follow up (Soreness of mucosa)

Follow up	Soreness of mucosa	Study subjects				p value
		Group I (n=51)		Group II (n=15)		
		No.	%	No.	%	
Baseline						
	Present	19	37.3	12	80.0	0.007**
	Absent	32	62.7	3	20.0	
2nd wk						
	Present	2	3.9	11	73.3	0.001***
	Absent	49	96.1	4	26.7	
4th wk						
	Present	0	.0	10	66.7	0.001***
	Absent	51	100.0	5	33.3	
6th wk						
	Present	0	.0	10	66.7	0.001***
	Absent	51	100.0	5	33.3	
6 months						
	Present	0	.0	4	26.7	0.001***
	Absent	51	100.0	11	73.3	

Group I= Patients treated with soft liner
Group II= Patients treated with conventional method
p value reached from chi square test
**= significant
***= highly significant

Table-IV

Distribution of patients by pre and post treatment follow up (Retention and stability)

Follow up	Retention and stability	Study subjects				p value
		Group I (n=51)		Group II (n=15)		
		No.	%	No.	%	
Pretreatment	Present	2	3.9	1	6.7	0.545ns
	Absent	49	96.1	14	93.3	
Post-treatment	Present	0	0.0	5	33.3	0.005**
	Absent	51	100.0	10	66.7	

Group I= Patients treated with soft liner
Group II= Patients treated with conventional method
p value reached from chi square test
ns= not significant
**= significant

Table-V

Distribution of patients by overall assessment

Assessment	Study subjects				Total		p value
	Group I		Group II				
	No.	%	No.	%	No.	%	
Poor	0	0.0	9	60.0	9	13.6	0.001***
Average	30	58.8	6	40.0	36	54.5	
Excellent	21	41.2	0	0.0	21	31.8	
Total	51	100.0	15	100.0	66	100.0	

Group I= Patients treated with soft liner
Group II= Patients treated with conventional method
P value reached from chi square test
***= highly significant

Discussion:

In this study a total number patients were 66. Out of them 51 cases were in group- I and 15 cases were in group-II. Their average age range were from 39-70 years. Male were 46 and female were 20 Edentulism was more in 55-70 years of age group. Treatment was taken more in male patient than female.

This study showed soft lined denture was much more comfortable in 88.2% of the patients than their conventional acrylic resin dentures in group- I. In this study initially no statistically significant difference was found between two groups of patients, however, during subsequent period, the feeling of comfortness was improved significantly in group I patients compared to group II patients. The percentage of improvement was 45.8% in group I patients and it was 30.0% in group II patients and the difference was statistically significant. Previous study[4] showed dentures lined by Molloplast- B were comfortable in 93% patients.

In this study denture lined with Molloplast- B chewing or masticatory function were improved in 86.3%. Baseline data showed that chewing efficiency had no statistically significant difference between two groups of patient. After treatment, the chewing efficiency increased more in patients treated with soft line than conventional treatment. Percentage of changes indicated that the chewing efficiency increased 41.2% in group I patients and it was only 15.6% in group II patients and the difference was statistically significant. Because soft liner act as a shock absorber during mastication and reduces discomfort, soreness of tissue and increase retention and stability.

In this study had found the average tissue health of the patients examined in this study was fair to good. Pressure soreness of tissue was relieved (100%) by using Molloplast-B soft-liner. It was observed that initially 37.3% patients in group I patients had soreness in mucosa. At the 2nd week follow up only 3.9% had complaints of soreness of mucosa and subsequent follow up no patients complaints of soreness of mucosa, whereas among the group II patients, 80.0% had complaints of soreness of mucosa and following treatment the soreness of mucosa decrease to 26.7% at the end of 6 months. These indicated that the rate of healing was very slow in conventional treatment to treatment by soft liner. And the difference was statistically significant.

In this study most of the cases retention and stability was good. William et al. evaluated 24 complete denture lined by soft liners and showed good retention and stability was less satisfactory.

The problem of reduced tissue tolerance to denture is due to reduced denture surface area occurring with the bone loss of alveolar bone. Many patients experience pain and difficulty using dentures constructed with hard denture bases. The resilient materials have been used in the tissue surface of the denture to increase resilience during function and under pressure.[6]

Wilson et al. [7] evaluated the soft resilient silicone rubber, silastic 390. Heat – cured silicones such as Molloplast – B and Silastic- 390 emerged as the most suitable for clinical use. The comprehensive evaluation of resilient denture liners reported by laney (1964) also pinpointed Molloplast– B and Silastic- 390 as the effective base for patient who exhibit dehydration, mucosal irritation, and bone loss.

Haris, in 1961 said, "If there were a material for cushioning dentures that would retain those soft, compatible properties as long as one year, most of chronic complaints in denture service would be eliminated". Some believed that this had been attained in the use of silicone rubber.[8]

The use of resilient lining materials for denture prosthesis in selected clinical situation has long been recognized. Gonzales listed numerous indications for their use and Masella reported that they are most advantageous in treating the patient with sharp, thin or badly resorbed residual alveolar ridges.

Bernard and Segal[9] observed 36 patients with Molloplast-B lined dentures for up-to 3 years. These patients were chosen because they had demonstrated that chronic soreness present under their conventional acrylic dentures. In their study the show sixty percent of the patient said that they were more comfortable with the Molloplast- B lined dentures than previous acrylic resin dentures.

Hiroki et al.[10] followed up 18 patient with Molloplast- B lined denture for up-to 3 years. These patient had previous complained of chronic tissue soreness with conventional acrylic resin dentures. Two weeks after insertion situation were better than before with soft lining in all patient.

John L[11] examined dentures lined by silicone, soft relining material and found improved masticatory function. They suggest that the use of materials with higher 'ten delta and G' provides the most optimum masticatory function.

In case of maxillofacial prosthesis we have found an extra retention facility by the use of soft liners as it engage the tissue undercuts without harmful effect to the tissue.

In case of maxillofacial prosthesis lined by Molloplast – B nasal regurgitation was absent in most cases. It is due to

viscoelasticity of these materials and it blocks the aperture like a valve.

Conclusion:

Molloplast – B lined denture offered comfort and masticatory efficiency to a significant number of patients in this study who had a history of chronic discomfort with the wearing of conventional acrylic resin dentures. The problems of retention and stability in removable maxillofacial prosthesis can be also managed by using Molloplast – B. So, it is recommended to use Molloplast – B in removable prosthesis for the betterment of patients. Further studies with a large sample required to demonstrate this hypothesis tested in this study.

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