

STUDY ON OCULAR PROSTHESIS FOR THE REHABILITATION OF PATIENT WITH EX-OPHTHALMIC SOCKET

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Abstract

Background : Among the extra-oral maxillo-facial prosthesis, single ocular prosthesis is one of the important type- which is concerned with the patient's psychological, emotional status and facial expression. This prosthesis fits over an orbital implant and under the eye-lids. Typically known as glass eye which provides no vision only aesthetics. Ocular prosthesis are made of glass, medical grade plastics, PMMA, silicone, plaster. Ocular prosthesis may be ready-made or custom-made. The objective of the study was to compare the ready-made and custom-made ocular prosthesis for providing best rehabilitation of patient with ex-ophthalmic socketed (Single).

Materials and methods: It was a prospective comparative in vivo study carried out Department of Prosthodontics, Faculty of Dentistry, BSMMU, Dhaka from January 2009 to December 2010. 40 patients with single ex-ophthalmic socket were selected from outpatient department considering the inclusion and exclusion criteria. The patients were divided into two groups. In group A 20 patients were given custom-made ocular prosthesis. In group B 20 patients were given ready-made ocular prosthesis, patients were observed clinically and evaluation were done on the day of insertion, after 1 week, 2 week, 1 month, 3 months, 6 months interval.

Results: The results were evaluated by specific parameter as comfort, aesthetic, movement of the ocular prosthesis during facial expression. After observing the patients it was revealed that custom made ocular prosthesis was better in comfort, aesthetic and movement during facial expression than readymade one.

Conclusion : This study revealed that custom made ocular prosthesis is better for the rehabilitation of the patient with single ex-ophthalmic socket. Ready made one can be used for a short period of time as a temporary measure.

Key words

Ocular; Prosthesis; Aesthetic; Maxillofacial.

Introduction

Prosthesis is the device which replaces any missing or defective organ of human body by artificial non living substance for the well being of human. Maxillo-facial prosthesis are the art and science of functional anatomic and cosmetic reconstruction by the use of nonliving substitute of those region of maxillae, mandible and face- which are missing or defective¹.

Among extra-oral maxillo-facial prosthesis- ocular prosthesis is important one. As the most commonly occurring loss of one of these sensory organ is an eye, such a tragedy may have a tremendous emotional & psychological impact on patient². Though the ocular prosthesis has no visual function but aesthetic and movement of the eyeball during person's facial expression are very important to overcome the emotional and psychological impact. Here symmetry (Size, shape, contour, color of iris, cornea & pupil) movement (Six direction) with facial expression and comfort are to be considered with priority basis³. At the same time retention, stability, reaction to surrounding tissues, tear drainage, over weight, bio-compatibility are to be considered. Ocular prosthesis should not be hazardous and fatigue to the surrounding residual tissues^{4,5}.

Different materials are tried and used for ocular prosthesis e.g glass, plaster, silicon, plastic shell,

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Submitted on : 14.01.2020

Accepted on : 22.01.2020

poly methyl meth Acryl-ate PMMA⁵. Before World War-II, however all ocular prosthesis were made of glass and supplied in standard sizes and color that could not be altered. In 1944 investigator at the Naval graduate dental school developed a custom fitted methyl meth acryl ate resin ocular prosthesis. Since every socket differs in size and shape- so each patient demands individually designed prosthesis made from an impression of the socket for better aesthetic and comfort⁶. This study describes effects (Aesthetic, comfort well being of individual) of ready made and custom made ocular prosthesis.

Materials and methods

It was a prospective comparative in vivo study carried out Department of Prosthodontics, Faculty of Dentistry, BSMMU, Dhaka from January 2009 to December 2010. Eligible subject were those who had single anophthalmic socket through the surgical procedure of evisceration and enucleation. Total 40 sample were included. The patients were divided into two groups. In group A 20 patients were given custom-made ocular prosthesis. In group B 20 patients were given ready-made ocular prosthesis, patients were observed clinically and evaluation were done on the day of insertion, after 1 week, 2 week, 1 month, 3 months, 6 months interval.

After period of time usually 6-8 weeks that needed for the healing and reduction of the tissue swelling, then the patient was ready for prosthesis. Each of the patients was evaluated by a through medical, dental & ocular history as well as clinical examination, diagnostic and radiographic examination as per history sheet. Ocular prosthesis mayh be ready-made and custom-made. Since every socket differs in size and shape, it is obvious that an individually designed prosthesis, made from an impression of the socket, is needed to utilize the full movement potential of an implant and also to provide maximum comfort and restore full physiologic function to the accessory organ of the eye. Data were collected pre-designed data collection sheet. Data were analysis using computer based programme Statistical Package for Social Science (SPSS) for windows version 16. The result were presented in table and t-test was done to find out the p value. p value (<0.05) was consider as significant.

Results

Table I : Distribution of patients in term of comfort at different follow-up visit.

Comfort index	Group A		Group B		p value
	No	%	No	%	
Day of insertion					
Grade I : Good	4	20.0	2	10.0	0.420
Grade II : Fair	10	50.0	14	70.0	
Grade III: Poor	6	30.0	4	20.0	
After 1 week					
Grade I : Good	12	60.0	2	10.0	0.001
Grade II : Fair	8	40.0	18	90.0	
Grade III: Poor	0	00	0	00	
After 2 weeks					
Grade I : Good	18	90.0	6	30.0	0.001
Grade II : Fair	2	10.0	12	60.0	
Grade III: Poor	0	00	2	10.0	
After 1 month					
Grade I : Good	18	90.0	10	50.0	0.019
Grade II : Fair	2	10.0	8	40.0	
Grade III: Poor	0	00	2	10.0	
After 3 months					
Grade I : Good	18	90.0	14	70.0	0.014
Grade II : Fair	2	10.0	0	00	
Grade III: Poor	0	00	6	30.0	
After 6 months					
Grade I : Good	18	90.0	14	70.0	0.014
Grade II : Fair	2	10.0	0	00	
Grade III: Poor	0	00	6	30.0	

Group A: Custom-made ocular prosthesis

Group B: Readymade ocular prosthesis

Grade I : Good-rarely cause discomfort

Grade II: Fair-occasional soreness but still able to wear the prosthesis.

Grade III: Poor-continuous soreness or unable to wear the prosthesis.

Table II : Distribution of patients in term of aesthetic at different follow-up visit.

Comfort index	Group A		Group B		p value
	No	%	No	%	
Day of insertion					
Grade I : Good	6	30.0	0	00	0.001
Grade II : Fair	12	60.0	8	40.0	
Grade III: Poor	2	10.0	12	60.0	
After 1 week					
Grade I : Good	6	30.0	0	00	0.001
Grade II : Fair	12	60.0	8	40.0	
Grade III: Poor	2	10.0	12	60.0	

After 2 weeks					
Grade I : Good	6	30.0	0	00	0.001
Grade II : Fair	14	70.0	8	40.0	
Grade III: Poor	0	00	12	60.0	
After 1 month					
Grade I : Good	11	55.0	0	00	0.001
Grade II : Fair	9	45.0	6	30.0	
Grade III: Poor	2	10.0	14	70.0	
After 3 months					
Grade I : Good	14	70.0	0	00	0.001
Grade II : Fair	6	30.0	6	30.0	
Grade III: Poor	0	00	14	70.0	
After 6 months					
Grade I : Good	18	90.0	0	00	0.001
Grade II : Fair	2	10.0	6	30.0	
Grade III: Poor	0	00	14	70.0	

Group A: Custom-made ocular prosthesis

Group B: Readymade ocular prosthesis.

Grade I : Good-rarely cause discomfort

Grade II: Fair-occasional soreness but still able to wear the prosthesis.

Grade III: Poor-continuous soreness or unable to wear the prosthesis.

Table III : Distribution of patients in term of ocular prosthesis during facial expression at different follow-up visit.

Comfort index	Group A		Group B		p value
	No	%	No	%	
Day of insertion					
GI (0): Standard movement	0	00	0	00	0.001
Grade II(-1): Mild restriction	6	30.0	0	00	
Grade III(-2): Moderate restriction	8	40.0	3	15.0	
Grade IV(-3): Severe restriction	6	30.0	10	50.0	
Grade V(-4): Full restriction	0	00	7	35.0	
After 1 week					
GI (0): Standard movement	0	00	0	00	0.001
Grade II(-1): Mild restriction	8	40.0	0	00	
Grade III(-2): Moderate restriction	6	30.0	4	20.0	
Grade IV(-3): Severe restriction	6	30.0	9	45.0	
Grade V(-4): Full restriction	0	00	7	35.0	
After 2 weeks					
GI (0): Standard movement	0	00	0	00	0.001
Grade II(-1): Mild restriction	10	50.0	0	00	
Grade III(-2): Moderate restriction	4	20.0	5	25.0	
Grade IV(-3): Severe restriction	6	30.0	9	45.0	
Grade V(-4): Full restriction	0	00	6	30.0	

After 1 month					
GI (0): Standard movement	2	10.0	0	00	0.001
Grade II(-1): Mild restriction	11	55.0	0	00	
Grade III(-2): Moderate restriction	5	25.0	7	35.0	
Grade IV(-3): Severe restriction	2	10.0	8	40.0	
Grade V(-4): Full restriction	0	00	5	25.0	
After 3 month					
GI (0): Standard movement	3	15.0	0	00	0.001
Grade II(-1): Mild restriction	12	60.0	0	00	
Grade III(-2): Moderate restriction	3	15.0	8	40.0	
Grade IV(-3): Severe restriction	2	10.0	8	40.0	
Grade V(-4): Full restriction	0	00	4	20.0	
After 6 month					
GI (0): Standard movement	3	15.0	0	00	0.001
Grade II(-1): Mild restriction	13	65.0	0	00	
Grade III(-2): Moderate restriction	2	10.0	9	45.0	
Grade IV(-3): Severe restriction	2	10.0	7	35.0	
Grade V(-4): Full restriction	0	00	4	20.0	

Group A: Custom-made ocular prosthesis

Group B: Readymade ocular prosthesis.

Discussion

Ocular prosthesis has got gradual upgradation prosthesis though many method and technique. New method, technique and material are invented to advance the success of prosthesis. Through these revolution modern method has provided best service to humanity by improving life style.

Now a days during enucleation and evisceration of orbital socket- an implant (heterogenous/autograft-demofat) is placed and secured within the socket by suturing different muscles. It definitely improves the motility of prosthesis and prevent socket contraction and facial disfiguration. After healing (6-8 weeks) of anophthalmic socket prosthesis either ready-made or custom-made were fitted.

Our study emphasis on the service (Comfort, aesthetic, movement) provided by the custom-made and ready-made ocular prosthesis. Different health worker of home and abroad had worked on the improvement of ocular prosthesis. And their work were published in different journal and publications.

In this study patients with single anophthalmic socket were selected considering the criteria (Inclusion and exclusion). Accordingly group –A and group B patients were treated with custom-made and ready-made ocular prosthesis. Timely data were collected as per the schedule. Finally the result and outcome measures were statistically analyzed and presented from different angle.

Regarding comfort of the ocular prosthesis it could be said that first experience of wearing ocular prosthesis might cause tenderness from the unaccustomed use.⁷ In our study group- A with custom-made ocular prosthesis show cases comfortable out of 20 patients on the day of insertion. During follow-up stage- more number of patients showed good comfort. It can be said that comfort rate increase in uprising manner visit by visit. At the same time poor grade were declining and zero in number at the last.

On the other hand in group B only two cases of 20 showed good comfortable at the day of insertion. During follow-up visit the good comfort number increases in a slow motion. At the same time poor grade comfort increases slightly.

Considering the above uprising, declination, slow motion, etc. It can be said that the custom-made ocular prosthesis is better than ready-made one in the ground of comfort. Comfort of the ocular prosthesis is related to excessive secretion, irritation, persistence aching in the socket- which are caused by following agents- winds, headcold, allergies, extreme temperature, hand contamination, local inflammation of the socket bed, sharpness, roughness, scratches, oversize of prosthesis. Correction of the above mentioned agents will improve the comfort level.

Regarding the movement of the ocular prosthesis during facial expression is important aspect of the overall cosmetic appearance which produce life like eye similar in all aspect to the normal fellow eye. Several theories and methods are invented and applied such as using integrating prosthetic material, pegging the implant, covering the implant with scleral tissue, suturing the eye muscles directly to the prosthetic implant⁷. Movement is transmitted through the surface tension at the conjunctival-prosthesis interface and movement of the fornices. Therefore any movement of the conjunctival fornices will cause a similar movement of the artificial eye whereas lack of movement of the fornices will restrict its motility⁸.

In our study group A (Custom-made ocular prosthesis) and group B (Ready made) both initially showed no standard movement (Grade 1) on the day of insertion after 1st week and after 2nd week. Then on following visit, in group A more number of patient showed grade I and II level movement. Later on grade I and II score increases gradually visit by visit.

Considering the above uprising, declining and slow motion of the number of patient in the field of motility- it can be said the custom made ocular prosthesis is better than ready-made one.

Limitations

The study has its limitations. First, only one eye lost patients were included in the study. Second, lower socio-economic class patients are not included. Another drawback of the study was small sample size. Only forty samples were included in the study.

Conclusion

For the rehabilitation of the patient with single an ophthalmic socket-A series of work plan are needed gradually. For custom-made ocular prosthesis:-

- i) Placement of implant or graft during surgery
- ii) Preparation of custom-made ocular prosthesis with proper fit, contour, color, right position of iris and cornea
- iii) Follow-up visit to correct unassessness.

Ready- made ocular prosthesis are available in the market in different size, colour and texture. So they are chosen considering the fellow eye and inserted into the socket. Due to the shortage of technical hand (Ocularist) time, money, lack of knowledge – we provide ready-made ocular prosthesis that may not fulfill our target it may not provide good comfort, aesthetic and motility sometime it resembles like a stone eye. It may be a temporary measure. For the betterment of the patient, custom-made ocular prosthesis is suitable, pleasing and life like.

Recommendation

Multicentre with large size study is recommended.

Acknowledgements

The authors would like to thank all survey participants for their involvements in the survey. The authors also would like to thanks Dr. Md. Golam Haider, Associate Professor, National Institute of Eye Science and Hospital, Dhaka for his brilliant contributions.

Contribution of authors

FU- Conception, acquisition of data, critical revision and final approval.

MS- Design, analysis, critical revision and final approval.

SMSQ- Interpretation of data, drafting, critical revision and final approval.

IRP-Design, drafting and final approval.

ARMM- Design, acquisition of data, drafting the article and final approval.

MKU- Acquisition of data, analysis, critical revision and final approval.

Disclosure

All the authors declared no conflict of interest.

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