A STUDY ON EFFICACY OF MANUAL SMALL INCISION CATARACT SURGERY BY TEMPORAL APPROACH

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ABSTRACT

BACKGROUND
Manual Small Incision Cataract Surgery (MSICS) is a well-known technique of cataract surgery owing to its advantage of a self-sealing suture less incision with least surgically induced astigmatism at a low cost. It is a safe, simple, consistent, stable and cost-effective technique with various modifications that involve site, size, type of incision and method of nucleus delivery. One such modification is Temporal Incision MSICS, where the cataract surgery is done by a temporal approach, which is equally good compared to the superior incision. This study was done retrospectively to analyse the visual outcome of patients operated by Manual SICS - Temporal Approach, using the WHO criteria and to establish its efficacy as a good surgical technique.

MATERIALS AND METHODS
Records of patients operated for senile cataract by a single surgeon by Temporal MSICS using a temporal sclerocorneal incision of 6-6.5 mm, during a 1-year period, were analysed retrospectively. Post-operative followup records of POD-1 and subsequent follow-ups at 1st week and 6th week were recorded for visual outcome.

RESULTS
Out of the 83 cases analysed retrospectively, majority of them were found to be between 61-70 years with a female Preponderance. Most of the cases were found to have senile immature cataract (55 patients), with Grade III nuclear sclerosis (52 cases). The pre-operative visual acuity was poor <6/60 in 72 cases (86.7%) and borderline in 11 cases (14.5%). 55 cases (66.3%) had a 6.5 mm scleral incision and the remaining 28 cases (33.7%) had a 6 mm incision. Average duration of surgery noted was 8.35 minutes. Striate Keratopathy was the most common 1st POD complication followed by corneal oedema. Striate keratopathy was the most common complication at the 1st week followup followed by pigment dispersion. Majority of cases (76 cases) were found to have been complication free at the end of 6 weeks. At the end of 6 weeks post-operatively as per records, 80 cases (96.4%) had good BCVA and only 3 (3.6%) cases had borderline vision and none had < 6/60 vision, which fulfilled the WHO criteria of 90% BCVA post-op with <5% poor vision. Here the 80% threshold was found to have been attained in the 1st post-op week itself, based on our observations. Difference between pre-op and post-op Keratometry values were minimal, also the distribution of types of astigmatism appeared similar to that of pre-op astigmatism.

CONCLUSION
In this study it was found that the temporal approach MSICS fulfilled the WHO criteria for good surgical technique, and it is a safe and reliable method and is complementary and equally effective to other standardised techniques and approaches, with less complications and early visual rehabilitation.

KEYWORDS
Temporal Incision, Manual SICS, Self – Sealing, Suture Less Incision, Less Astigmatism.

BACKGROUND
Manual Small Incision Cataract Surgery (MSICS) is an alternative surgical technique that developed after Phacoemulsification.

In this technique, the whole nucleus is removed through a self- sealing sutureless tunnel incision. As there is an earlier occurrence of cataract and delay in seeking treatment, there is a significantly increasing proportion of mature, hypermature cataracts, dense brown, black cataracts associated with pseudoexfoliation and subluxation for which MSICS is a better option.

Also, MSICS is considered as the most appropriate technique for performing high volume cataract surgery due to its efficiency, safety, shorter surgical time and lower cost, and to tackle the backlog of cataract cases. Therefore, it is prudent to consider Manual Small Incision Cataract Surgery as a safer option than ECCE and equivalent option to Phacoemulsification in our setup.[1]

In the quest to achieve best possible post-operative vision, the cataract surgeons have improvised the technique by various modifications – one such modification is the Ruit technique that uses a temporal scleral tunnel straight incision of 6-7 mm.

Various studies have proved that MSICS by temporal approach gives equally excellent visual outcome as phacoemulsification, and is significantly a faster, less expensive, less technology dependent technique compared to the latter.[2,3] This technique also provides a better stabilisation of refraction and better uncorrected visual acuity compared to superior approach.[4,5]

Advantages of Temporal approach-
1. Less changes in corneal curvature comparable to superior incisions thereby leading to less surgically induced astigmatism,
2. Better wound healing due to the absence of distractive force of blinking,
3. No interference of gravity with wound healing as the wound is parallel to the vector of forces,
4. Temporal incision is further away from the visual axis of the eye than the superior incision, hence any post-operative corneal oedema will not affect the immediate visual rehabilitation,
5. Wound construction by this method easier in deeper sockets and small eyes, eyes with filtering bleb,
6. Superior conjunctiva left intact here which can be used for trabeculectomy if needed in future,
7. Can be used as a component in 2 site technique in combined cataract and glaucoma surgery,
8. Safer in brown, hard cataracts.

Visual Outcome of MSICS
Outcome of the surgery depends on many factors like preoperative ocular status, quality of surgery, post-operative refractive error correction. WHO categorises the outcome of cataract surgery in 3 groups: good, borderline, poor. It recommends aiming for a "good", uncorrected visual acuity in at least 80% surgeries, and "poor" outcome in less than 5%.

WHO Guidelines for Postoperative Visual Outcome of Cataract Surgery with IOL.

Grade	V/A	UCVA Postop	CVA Postop
Good	6/6 – 6/18	80%	90% +
Borderline	<6/18-6/60	15%	<5%
Poor	<6/60	<5%	<5%
Table 1. WHO Guidelines for Postoperative Visual Outcome of Cataract Surgery with IOL			

Aims and Objectives- This study was done retrospectively to analyse the visual outcome of patients operated by Manual SICS- temporal approach, to establish it as an equivalent technique to superior approach.

Inclusion Criteria
1. Patients diagnosed with senile immature cataract
2. Patients diagnosed with senile hypermature cataract
3. Grading: Nuclear Sclerosis 1-4.

Exclusion Criteria
1. Cases that have not come for 6 weeks follow-up
2. Cases with pterygium, corneal pathology, very high/ irregular astigmatism, co-existing glaucoma, uveitis, subluxated lens, traumatic cataract, one eyed patients, aphakic patients.

MATERIALS AND METHODS
Records of patients operated for senile cataract by a single surgeon by Temporal MSICS using a temporal sclerocorneal incision of 6-6.5 mm, during a 1-year period, were analysed retrospectively. Post-operative followup records of POD-1 and subsequent follow-ups at 1st week and 6th week were analysed for visual outcome of the above procedure.

As per the records of these patients, pre- operative workup parameters were analysed for inclusion/ exclusion. The cases operated by a single surgeon by temporal approach– MSICS, were selected to rule out the impact of confounding surgeon factor.

Age, sex, type of cataract, nuclear grading, incision size, duration of Surgery documented in the case records were analysed for all cases.

Post-operative follow up records of day 1, at the end of 1 week and at the end of 6 weeks post- op were analysed for UCVA and complications.

For all the cases included in the study, BCVA and refraction values obtained after dilation and plane mirror retinoscopy were recorded.

Keratometry reading that was taken to calculate the astigmatic change caused by surgery, were also obtained from the post-operative records and compared with the pre-operative values.

RESULTS
From the patient records, it was found that out of the 83 cases studied, majority of cases were in the age group 61-70 years.
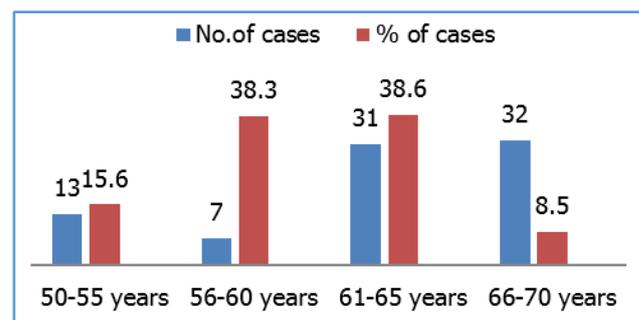

Figure 1. Age Distribution of Study Group

The study group comprised of 53 (63.9%) female patients and 30 (36.1%) male patients.

Sex	No. of Cases	Percentage of Cases
Male	30	36.1
Female	53	63.9
Total	**83**	**100**
Table 2. Sex distribution of Study Group		

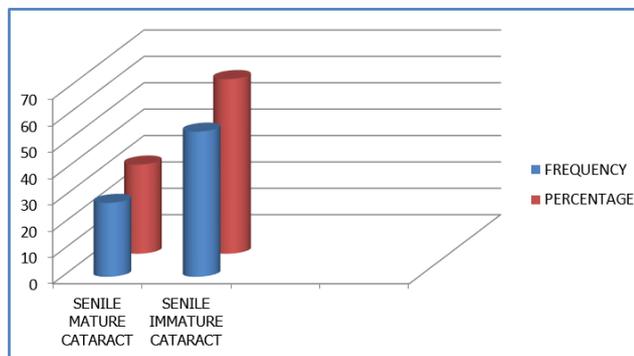Among the 83 cases analysed, 28 were senile mature cataract and 55- senile immature cataract.

Figure 2. Frequency and Percentage of Various Cataract Types in the Study Group

The hardness of the cataract was graded pre-op based on the colour of nucleus under slit lamp examination. Grade III nuclear sclerosis was predominantly found in the study group – 52 cases (62.6%). Grade II was found in 19 (22.9%) and Grade IV in 12 cases (14.5%).

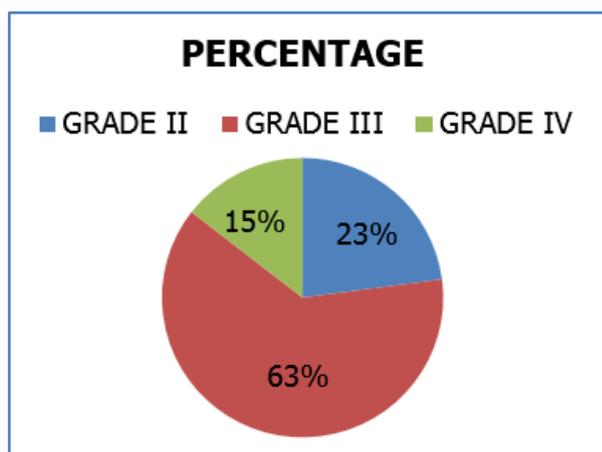| Nucleus Grade	Frequency	Percentage
II	19	22.9%
III	52	62.6%
IV	12	14.5%
Total	**83**	**100%**
Table 3. Frequency and Percentage of Different Nuclear Grades of cataract in the Study Group		

Figure 3. Percentage of Different Grades of Nuclear Sclerosis in the Study Group

The pre-operative visual acuity was poor <6/60 in 72 cases (86.7%) and borderline in 11 (14.5%). Among the 72 cases, 15 of them had <1/60 vision.

All the analysed patient records were those operated by a single surgeon by a temporal sclerocorneal tunnel incision after a 2 site technique of peribulbar anaesthesia. The size of the incision was 6-7 mm. 55 cases (66.3%) had a 6.5 mm scleral incision and the remaining 28 cases (33.7%) had a 6 mm incision. The duration of the surgery recorded in the case sheets were analysed. 51 cases (61.4%) were operated in 8 minutes. 24 cases (29%) were completed in 10 minutes and 8 cases (9.6%) in 6 minutes. Average duration noted was 8.35 minutes. It was found from the case records that an additional procedure– sphincterotomy was done in 2 cases with undilated pupil to facilitate nucleus delivery.

1st POD Vision- Graded According to WHO grading of Post Cataract Surgery V/A.

Vision Grade	Frequency	Percentage
1 (good)	52	62.7
2 (borderline)	29	34.9
3 (poor)	2	2.5
Total	**83**	**100**
Table 4. 1st POD Vision- Graded According to WHO grading of Post Cataract Surgery V/A		
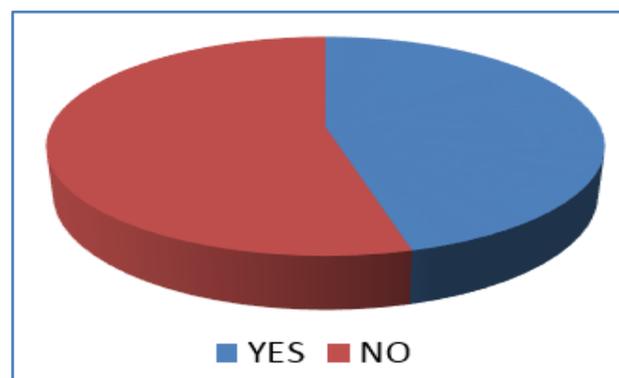
Figure 4. Iˢᵗ POD Complications

Complication	Frequency	Percentage
No	45	54.2
Yes	38	45.8
Total	**83**	**100**
Table 5. 1st POD Complications		

45 cases (54.2%) were found to have been normal on slit lamp examination, as per the records. The remaining cases had complications. Striate keratopathy was the most common complication (29 cases) noted, corneal edema was seen in only 6 cases out of which only 2 cases had poor vision, iritis was noted in 8 cases and all of them had responded well to medical management. Descemet's folds near the side port were seen in 3 cases.

Even though 45.8% cases had complications, among them 62.7% had good visual acuity, 34.9% cases had borderline visual acuity and only 2.5% cases had poor visual acuity. This implies that 1st POD complications were mild in nature and amenable to treatment.

Vision Grade	Frequency	Percentage
1 (Good)	71	85.6
2 (Borderline)	11	13.2
3 (Poor)	1	1.2
Total	83	100

Table 6. 1st Post- op Week Vision
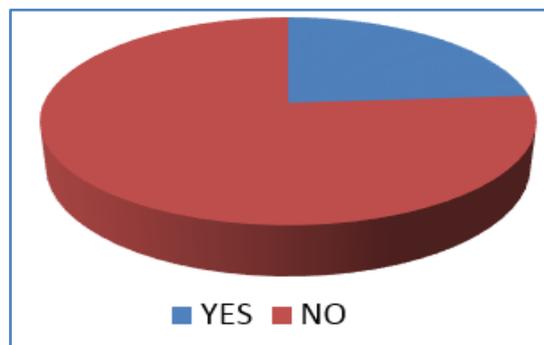
Figure 5. 1st Week Complications

Complication	Frequency	Percentage
No	62	74.6
Yes	21	23.4
Total	**83**	**100**

Table 7. 1st Week Complications

Striate Keratopathy (9 cases) was the most common complication noted in the 1st week post-operative records, followed by Pigment Dispersion (6 cases). Corneal Oedema was seen in the same 2 cases as on POD 1 with decreased severity, iritis in 6 cases had recovered with medical management and in 2 cases had decreased severity.

The percentage of complications had reduced significantly from 45.8% to 23.4% in 1st week. This signifies the faster wound healing nature.

Vision Grade	Frequency	Percentage
1 (good)	80	96.4
2 (Borderline)	3	3.6
3 (Poor)	0	0
Total	83	100

Table 8. 6th Post- op Week vision

From the 6th week follow-up records, BCVA obtained after dilated retinoscopy and post- mydriatic test was noted. Keratometry K values – to find out the corneal astigmatism was also noted in all the cases.

Visual acuity after refraction was recorded to see if the overall outcome of Temporal Msics fulfilled the WHO recommendations.
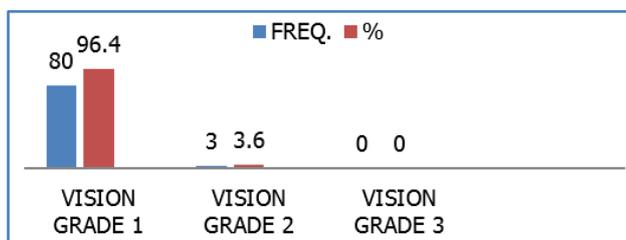

Figure 6. 6th Post- op Week vision

80 cases (96.4%) had good BCVA and only 3 (3.6%) cases had borderline vision, and none had <6/60 vision.

This fulfilled the WHO guidelines of 90% BCVA post-op with <5% poor vision. Here as per the records, 80% threshold was attained in the 1st week postop followup itself.
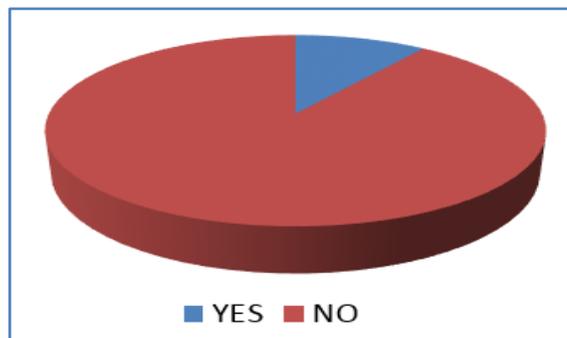

Figure 7. 6th Post- op Week Complications

Complication	Frequency	Percentage
No	76	91.6
Yes	7	8.4
Total	**83**	**100**

Table 9. Figure 7 .6th Post- op Week Complications

On analysing the records, it was observed that 76 cases (91.6%) were complication free at the end of 6 weeks, only 7 cases had complications– corneal oedema was persistent in 1 case with DM folds, striate keratopathy was found in 1 case accompanied by DM folds. This implies the corneal endothelial injury that would have been due to surgical trauma or lower endothelial count.

Keratometry Values- Keratometry readings recorded using automated manual keratometry both pre-op and post-op 6 weeks were noted from the case sheets and compared to find changes in corneal astigmatism, post-surgery. The difference was found to be very minimal in K1 and small in K2 values. This confirms the fact that sclero- corneal wound has minimal impact on the corneal curvatures.

Keratometry (d)	Pre-op	Post-op
K1	44.6473	44.6008
K2	45.6817	45.8494

Table 10. Keratometry Values - comparison

Corneal Astigmatism- Mean corneal astigmatism was calculated from the K readings with axis and all the cases were classified into with the rule, against the rule, oblique and NIL astigmatism.

Pre-op corneal astigmatism was WTR in 39 cases, ATR in 28 cases, OBLIQUE astigmatism in 12 cases, NIL astigmatism in 4 cases. Post-op corneal astigmatism was WTR in 38 cases, ATR in 30 cases, OBLIQUE astigmatism in 15 cases.
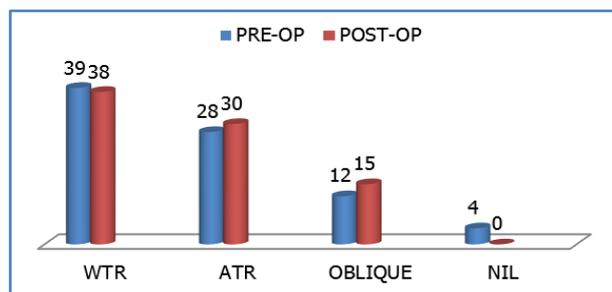
Figure 8. Comparison of Corneal Astigmatism

The distribution of types of astigmatism on post-operative assessment appeared similar to that of pre-operative astigmatism.

This implies the astigmatic neutrality of temporal scleral tunnel incision used in this study.[6]

DISCUSSION

Records of patients operated for senile cataract by a single surgeon by TEMPORAL MSICS using a temporal sclerocorneal incision of 6-6.5 mm, during a 1-year period, were analysed retrospectively.

The study group included age groups between 50-70 years of age and the mean age was 60 years. Female patients were 53, male were 30 in the study population. The study comprised of 28 senile mature cataract and 55 senile immature cataract patients, and had all three grades of Nuclear Sclerosis with Grade IV in 12 cases, Grade III in 52 cases, Grade II in 19 cases.

The pre-operative visual acuity was <6/60 in 72 cases, among them 15 cases had vision <1/60.

A single surgeon had operated all the cases under peribulbar anaesthesia. The temporal sclerocorneal incision of 6.5 mm was used in 55 cases, 6 mm incision used in remaining 28 cases.

All the selected cases had undergone similar technique of nucleus extraction by Phacosandwich technique, Capsulorrhexis, Hydroprocedures in the MSICS through temporal approach and a rigid 6.5 mm PCIOL was implanted in all cases after complete irrigation, aspiration.

Average surgical time was 8.35 minutes, based on the data obtained from the patient's operative notes.

Most common 1st postoperative day complication was Striate keratopathy and mild corneal oedema with DM folds was the 2nd common complication recorded.

UCVA on the POD 1 was >6/18 in 52 cases, < 6/60 in 2 cases.

Most common complication reported in 1st post op week followup was Striate keratopathy.

UCVA in 1st POST-OP week was> 6/18 in 71 cases and <6/60 in only one case.

No complications were seen in 76 cases. 2 cases had pre-existing PCO and the remaining cases had minimal SK.

BCVA on 6th POST-OP week was >6/18 in 80 cases and 6/18 − 6/60 in 3 cases. None of the operated cases had vision <6/60 There was no statistically significant change in the K1 values and a small change in K2 values pre- and post-op.[7,8,9]

85% of the study population attained good UCVA >6/18 in the 1st week, thus providing early rehabilitation to the patients.[10]

Here, our study results were similar to previous studies like Junejo S A, et al, Malik V K et al, SIDDIQUE M, et al.

Junejo S A, et al had concluded that the Non Phaco suture less cataract extraction through temporal approach ensures rapid visual recovery with minimum astigmatism against the rule.

Malik V K, et al had concluded that SICS with temporal approach provides a better stabilisation of refraction with significantly lesser surgically induced astigmatism compared to superior approach.

Siddique M, et al compared the visual outcome between superior and temporal approach in MSICS and concluded that both are safe and effective. Also, the temporal approach provides better uncorrected visual acuity and least and safe astigmatism.

CONCLUSION

Thus by our study, it is concluded that temporal small incision cataract surgery fulfils the WHO Criteria for good surgical technique. It is thereby a safe and reliable method of cataract surgery and it is complementary to other standardised techniques likely Phacoemulsification and superior approach MSICS.

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