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Comparative Analysis of Treatment Approaches for Anisometropic Amblyopia: Exploring Traditional Method, Dichoptic Therapy and Implantation of Collamer Lens

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Abstract:
Introduction: *Anisometropic Amblyopia is a prevalent Amblyopia with a numerous refractive difference between both eyes in patients. It is the major cause of binocular single vision anomalies, which can also lead to blindness if left untreated. According to traditional theory, anisometropic amblyopia is reversible with proper treatment only if the patient is under 12 years of age. However, recent findings suggest that amblyopia can also be reversed in adult patients if proper treatment is provided including surgical interventions.*
Aim: *This review article evaluates the effectiveness of the traditional therapies including optical correction, the dichoptic therapy, and the impact of Implantable Collamer Lens surgery as treatment options for anisometropic amblyopic patients of all age groups.*
Methods: *Articles on the treatment of anisometropic amblyopia with traditional therapies, dichoptic therapy, and implantable collamer lenses were searched in the Google Scholar, Scispace, and Scopus databases. These articles discuss the efficacy and accuracy of aforementioned treatment approaches.*
Results: *Evidences suggest that traditional therapy for amblyopia including optical correction, dichoptic therapy, and implantation of collamer lens provides a significant improvement and efficacious as management. Collamer Lens implantation is more effective compared to other refractive surgeries of any age. In some cases, it has been observed that the improvement is better when all these treatment options are used in combination.*
Conclusion: *In anisometropic amblyopia, both types of treatment options surgical and non-surgical are important. Implantable Collamer Lens serves as a viable treatment option for patients with higher degrees of anisometropia and not responding to other traditional therapies.*
Keywords: *"Anisometropic Amblyopia", "Comparative Analysis", "Treatment", "Traditional Method", "Dichoptic Therapy", "Implantable Collamer lens".*

1. INTRODUCTION:

Amblyopia is a vision impairment caused by interruption to the normal vision development, which cannot be completely treated by glasses, contact lenses, vision therapy, or other medical interventions alone. During a child's critical period of maturation if one eye (or, less commonly both eyes) perceives comparatively less clear image caused by structural and functional abnormality, the brain fails to process the perceived visual input from that eye and start relying on clearer visual input from the dominant eye which suppress the non-dominant eye. Statistically untreated amblyopia is one of the major causes of childhood blindness. The prevalence rate of amblyopia is 1% to 4% and among children ranges from 0.13% to 12.9% [1, 2]. Majorly found amblyopia is anisometropic amblyopia. A difference of more than 1 dioptre refractive error is observed between the two eyes. There are three types of anisometropic amblyopia which are primarily observed as: hyperopic, myopic, and astigmatic. Among these, hyperopic anisometropic amblyopia is maximally found. A lower-degree of hyperopic anisometropia is similarly amblyogenic as a higher-degree of myopic or mixed anisometropia [12]. Although it has already been mentioned that hypermetropic amblyopia is commonly found amblyopia, some cases suggest that there may also be a connection between anisometropic amblyopia and microtropia. The possibility of aniseikonia has also been observed in patients with anisometropic amblyopia [3]. Some studies have suggested that epiblepharon has a potential association with the development of astigmatism, which in turn may lead to anisometropic amblyopia [4].

Most common symptom of anisometropic amblyopia is blurred vision in one eye. The affected person fails to be aware of this because the dominant eye compensates for the weaker one, which is difficult to detect without an eye examination. Since the brain inhibits the perceived image of the suppressed eye, the affected person might have trouble seeing fine details, even if they wear corrective lenses [2].

Another noticeable symptom is poor depth perception (stereopsis) which is the third grade of binocular single vision, so a significant difference in depth perception between the two eyes can impair the ability to measure distances. This can make activities like catching a ball, pouring liquid, or navigating uneven surfaces, etc. are more difficult [2]. Eye strain and headaches may also happen because of the different inputs from each eye, especially when doing tasks that require visual concentration. Some individual may also have trouble during reading, as the retinal disparity between the two eyes can cause text to appear unclear or lead to frequent loss of place while reading [2]. In some cases, the affected person may develop a slight squint or eye drift, although this is more commonly associated with strabismic amblyopia.

Since anisometropic amblyopia often does not show noticeable external symptoms, it is usually detected during routine eye checkups. Diagnosis of symptoms is quite challenging in young children because they cannot precisely communicate their vision problems [5]. Diagnosing and assessing the seriousness of anisometropic amblyopia needs a comprehensive eye examination to evaluate visual acuity, refractive error, contrast sensitivity, and binocular function of both eyes. One of the primary assessments is visual acuity testing. This is done according to age, such as the Snellen chart for older children (mostly older than 5 years) and adults or
Picture-based acuity tests like Lea Symbol for younger children (younger than 5 years) who cannot read letters [5, 7].

Performing refraction is another challenging step in the diagnosis. Refraction can be performed subjectively by using the trial and error method or objectively by using retinoscope/ autorefractometer or both, to determine the exact refractive error of each eye. Cycloplegic refraction is often done in young children when anisometropic amblyopia is suspected. Cycloplegic eye drops temporarily paralyze the eye's ciliary muscles to allow an accurate measurement of refractive error without interference with accommodation.
Binocular vision assessment is done to evaluate the simultaneous macular perception, fusion and stereopsis. Tests such as the Worth 4 Dot test or 4 Prism base out test help to determine the suppressed eye. Stereopsis testing is also performed to evaluate depth perception, as patients with anisometropic amblyopia often exhibit reduced or absent binocular depth perception.

Fundoscopy and slit-lamp examinations are performed to exclude any structural abnormalities in the retina, optic nerve, or anterior eye structures that might be contributing to vision impairment. These tests help to differentiate amblyopia from other ocular conditions that may present with similar symptoms.

In some cases, electrophysiological tests such as visual evoked potentials (VEP) or electroretinography (ERG) may be used to examine the operational reliability of the visual pathway and retinal function. These tests can be particularly useful in pediatric patients who cannot reliably participate in subjective visual acuity testing [6].

Amblyopia testing is often included in pediatric vision screening in schools also to detect the amblyopic condition early. Because children with anisometropic amblyopia may not complain of vision problems due to the brain's adaptation, routine vision screening plays a crucial role in early detection and timely intervention.
Anisometropic amblyopia should be treated by boosting the use of the non-dominant eye more than the dominant eye. Several treatment options are available which are known as traditional therapies like patching, penalization, optical correction, etc. Also, one can go for surgical treatment if required. These procedures are often used in combination also to achieve the best outcomes.

The primary remedial strategy for anisometropic amblyopia is corrective lenses which equalize the refractive imbalance and reduce the suppression. Full-time wear of glasses can be enough, as this alone may lead to improvement in vision, especially in mild to moderate degrees of anisometropic amblyopia [7]. Contact lenses can sometimes be more effective than glasses in treating anisometropia for non-compliant with spectacles or may have higher degrees of anisometropia. Unlike glasses, which can cause differences in image magnification, contact lenses give a higher visual field and balanced image perception [3]. If glasses alone are not sufficient, then occlusion therapy can be induced which involves patching of the dominant eye, to encourage the use of suppressed eye. The patching duration depends on the severity and the patient's age, with younger children patching requires fewer hours to achieve significant improvement than adults [8]. Atropine eye drops can be used as an alternate option to patching, particularly for children who are non-compliant with wearing an eye patch [7].

Alongside optical correction and occlusion therapy, active vision therapy uses structured exercises that stimulate the non-dominant eye. Activities such as contrast sensitivity training, eye-tracking exercises, and computerized vision therapy programs help improve coordination and focus on the suppressed eye [9].

Dichoptic therapy is a modern treatment for anisometropic amblyopia which shows different visual stimuli to each eye through computer programs or VR. Unlike patching, it trains both eyes to work together by adjusting image clarity, to reduce the suppression. This method improves visual acuity and depth perception in a promising way, especially for children [10, 11].

Surgical correction may be required before initiating amblyopia treatment in high anisometropic amblyopia associated with congenital cataracts or severe ptosis [1]. Refractive surgery, such as ICL, LASIK, or PRK, is sometimes considered for adults who are non-compliant to optical correction. However, its use in pediatric patients is still under research and is typically reserved for severe cases where conventional optical correction is ineffective [1]. See the flowchart 1 mentioned below.

2. Literature review: The literature review based on the visual acuity outcomes before and after the traditional therapy treatment, dichoptic therapy, and implantation of collamer lens has been shown in Table 1, Table 2, and Table 3 respectively in below.

3. METHODOLOGY:

To organize a comprehensive review of the treatment of anisometropic amblyopia, a systematic literature search from 2009 to 2024 is conducted in reputable databases such as Scopus, Scispace, and Google Scholar. The search includes studies published in the last 15 years, with a focus on clinical trials, meta-analyses, and systematic reviews. Studies included in the review must focus on treatment strategies for anisometropic amblyopia in children and adults. Keywords used include **"**Anisometropic Amblyopia", "Comparative Analysis", "Treatment", "Traditional Method", "Dichoptic Therapy", and "Implantable Collamer lens (ICL)".

4. DISCUSSION:

Treatment of anisometropic amblyopia focuses on balancing the refractive error of both eyes to equalize the visual input. It includes optical correction, active vision therapy, patching, atropine penalization, and dichoptic therapy, which presents different stimuli in front of each eye to stimulate the binocular vision. While collamer lens implantation does not correct the anisometropic amblyopia directly, but it helps to equalize the refractive imbalance.

4.1) Traditional treatments for Anisometropic Amblyopia: Refractive error correction is the primary treatment for anisometropic amblyopia. This aims to improve visual acuity in the suppressed eye and ensure the proper rectification of refractive error in both the eyes and restore normal binocular function. By using corrective lenses, the image quality of both eyes becomes more similar, so that it reduces the disparity which regulates the suppression. In mild conditions wearing glasses alone can significantly improve vision in the amblyopic eye. The glasses must be worn consistently throughout the day for optimal results. Hyperopic anisometropic amblyopia generally shows a higher improvement compared to other types [12].

If optical correction alone is insufficient then occlusion therapy typically needs to be introduced. This involves covering the dominant eye with an eye patch, which forces the brain to depend on the amblyopic eye for visual input. The patching routine is usually determined based on the seriousness of amblyopia and the age of the patient [8, 9].

However, children often respond well to patching as their visual system is still developing. Although adult may require longer or more frequent patching session to achieve the desired outcome. Several hours of each day of consistent patching stimulate the suppressed eye effectively. If a comparison is made between active vision therapy and patching, there may not be any noticeable difference in terms of visual acuity improvement, but stereo acuity shows better improvement with active vision therapy compared to patching [30].

Though highly effective but patching can be challenging for hyperactive children who may resist wearing the patch or remove that without any instruction.

For children non-compliant with patching, penalization may be used as an alternative. Atropine (1%) eye drop temporarily blurs non-amblyopic eye and force the brain to use the suppressed eye. Atropine administers once in a week along with one +3D of near addition in non-amblyopic eye and the effects can last for almost 2 weeks. Though generally well-tolerated and can be an effective alternative to patching, especially for children who find patching is difficult or cosmetically less valued [12]. But it has some side effects, such as light sensitivity. Although, these are usually mild and reversible once the medication wears off. Additionally, atropine cannot be administered to patients with autism, cerebral palsy, CNS abnormalities, seizures, and developmental disorders.

Besides optical correction, occlusion therapy, and penalization another traditional treatment is active vision therapy [9, 33]. This includes a series of eye exercises and activities designed to improve the coordination between two eyes and enhance the visual abilities of the suppressed eye. Vision therapy trains the brain to use both the eyes together which improve the depth perception, binocular function and reduce the suppression. Exercises may involve both eyes to focus on a target together to complete a task, such as focusing and convergence, tracking and computer video games [9, 33]. Vision therapy is often used in conjunction with other treatments.

In early intervention the success of traditional treatments for anisometropic amblyopia is very high. Additionally, traditional treatments are especially effective in pediatric patients who are within or just beyond the development period. Though traditional methods may take longer time but still effective in older children and adults. Consistency and follow-up care are important, as amblyopia can reverse if treatment is discontinued prematurely or if the patient stops wearing corrective lenses or following the prescribed treatment plan.

4.2) Dichoptic Therapy: Dichoptic therapy is a treatment option for anisometropic amblyopia that focuses on enhancing binocular vision rather than just strengthening the amblyopic eye. Unlike traditional methods, dichoptic therapy trains both the eyes to work together by reducing suppression and enhance the binocular function.

The actual concept of dichoptic therapy is based on giving different visual stimuli separately to each eye in a restricted way to work simultaneously. To achieve the actual outcome of dichoptic therapy patients are instructed to do specially designed visual tasks, such as games or movies, in a stereoscopic setup, where the contrast of the images is adjusted accordingly for each eye [11].

The dominant eye typically perceives a lower contrast image, while the amblyopic eye perceives a higher contrast image. This restricted adjustment helps balance the visual input and forces the brain to fuse images from both the eyes to improve binocular function.

Dichoptic therapy is often executed through digital platforms such as computer-based programs, virtual reality (VR) systems, or specially designed mobile video games [11, 34]. These responsive set ups make the therapy more interesting, particularly for children, which enhances the compliance and treatment efficacy. Studies have stated that by using Bynocs® dichoptic training can bring significant improvements in visual acuity, depth perception, and contrast sensitivity [34]. It is particularly beneficial for patients who are non-compliant to traditional treatments [11, 34].

Antono Rodenet al., has been conducted research actively where it has been stated about the positive outcome of perceptual learning, video games and dichoptic therapy. It indicates the potential effectiveness of dichoptic therapy for improving visual function in amblyopia [31].

Currently, we come across software called VisuoPrime in research, which shows effective result among adults in treating anisometropic amblyopia [35].

One of the main advantages of dichoptic therapy is its ability to label the root cause of amblyopia by targeting binocular single vision anomalies rather than just treating amblyopic vision loss. This makes it an optimistic alternative to conventional therapies [10].
Even study shows that in anisometropic amblyopia dichoptic therapy is more effective than patching of the non-dominant eye for improvement of contrast sensitivity [32].
However, its long-term efficacy compared to established treatments is still under research. Some studies suggest that combining dichoptic therapy with traditional treatments may yield even better results.
Although dichoptic therapy has a significant ability to cure according to reports and it has a high success rate. But still some challenges remain. Proper application of dichoptic therapy requires skilled professionals (optometrists, ophthalmologists), and both time and patience to achieve the effective outcome. For children, this can be somewhat difficult as the concept is new to them.
Furthermore, it is not yet a complete replacement for traditional treatments. It carries out as an effective alternative approach, particularly for patients with persistent amblyopia and non-compliant to other traditional treatments. Future research and advancements in technology will likely refine its application and improve accessibility to make a key component of amblyopia management in the future.
If there is a significant higher degree of anisometropia present in anisometropic amblyopia, the failures observed in traditional treatment include a larger vertical PEP deviation and worse stereo acuity in children [13].

4.3) Collamer Lens Implantation (ICL) on Anisometropic Amblyopia: Implantable Collamer Lens surgery is performed to correct refractive error like myopia, hyperopia, and astigmatism in individuals who are not suitable candidates for corneal refractive eye surgeries like LASIK, LASEK or PRK. ICL is a type of posterior chamber phakic intra ocular lens (PCpIOL) [28].
Posterior chamber phakic intra ocular lens has lesser risk factor than anterior chamber phakic intra ocular lens as it is less visible externally and have lower endothelial cell loss. It involves placing a thin, biocompatible lens made from polymer and collagen, inside the eye between the iris and the crystalline lens [28].
This lens works with the crystalline lens to refocus light on the retina, providing clear vision without the need for refractive correction.
ICL surgery is performed when it is found that the cornea is very thin for laser assisted refractive surgeries or there is a high degree of refractive error or patient might have dry eye issues. The procedure is reversible, meaning the lens can be removed or replaced if necessary. It is also known for delivering high-definition vision, and quicker recovery times. People who go for ICL surgery often experience improved night vision and minimal glare compared to other refractive procedures [29]. ICL implantation is a surgical alternative option for managing anisometropic amblyopia, especially in cases where traditional optical corrections fail to provide acceptable outcomes. ICL can be chosen as an alternative surgical option for those who are not suitable candidates for other laser assisted refractive surgeries or who are non-compliant to conventional correction or when amblyopia persists despite early interventions [15, 27].
The primary advantage of ICL implantation in anisometropic amblyopia is its ability to correct high degrees of myopia, hyperopia which are associated with anisometropia. Unlike glasses or contact lenses, which can cause aniseikonia and discomfort, ICLs offer a more natural visual experience by adjusting optical distortions, balance the refractive error, reduces suppression and enhances binocular function.
It can be reasonably stated that in the pediatric population, phakic intraocular implantation (spherical or toric) has shown satisfactory safety and efficacy in the management of anisometropic myopic and anisometropic hyperopic amblyopia [15, 20, 24, 25].
Sherif A Eissa et al., in their study, stated that PCpIOL can be a better option for myopic anisometropic amblyopia in the pediatric population compared to Small Incision Lenticular Extraction (SMILE) in terms of efficacy with a success rate of 80% [16].
Research has shown that STAAR VISIAN Collamer Lens implantation has been found to be an effective treatment option especially in children, with neurobehavioral anomalies, such as autism, cerebral palsy, craniofacial abnormalities, ear deformities, and neck hypotonia, along with anisometropic amblyopia [1].
However, ICL implantation has carries some risks including cataract formation, higher intraocular pressure, and

endothelial cell loss. To reduce these risks, proper preoperative assessment is necessary, including anterior chamber depth assessment, endothelial cell count, and comprehensive ocular health examination. Postoperative monitoring is crucial to detect any adverse effects early and to ensure optimal visual recovery.

Sherif A Eissa et al., has stated in their research that secondary piggyback ICL implantation in the sulcus to correct unilateral pseudophakic anisometropic myopic amblyopia in pediatric population was found to be safe, effective, predictable, and well tolerated [17].

In terms of effectiveness, study of Jing Zhang et al., have demonstrated significant improvements in visual acuity and contrast sensitivity by providing the necessary optical clarity for amblyopia management. Even in adult patients with anisometropic myopic amblyopia, AcrySof Restor Collamer Lens implantation has shown a promising result. Along with improvement in visual acuity, partial restoration of binocular vision is also seen [19, 26].

In adults, as a solution for anisometropic amblyopia, Tecnis Eyehance IOL has shown improvement in cataract patient, while Collamer lens implantation has demonstrated positive outcomes in patients with corneal scars and anisometropic myopic amblyopia [21, 22].

ICL implantation is a valuable treatment option for anisometropic amblyopia, particularly in patients with high refractive errors who cannot tolerate conventional corrective methods. It offers a stable, high-quality visual correction while preserving the eye's natural lens and accommodative ability. Though it comes with potential risks, careful patient selection and postoperative care can help maximize its benefits. When integrated with other amblyopia treatments, ICL implantation can significantly contribute to improve visual function and quality of life.

5. Analysis: The success rate of **traditional treatment**, **dichoptic therapy**, and **ICL implantation** in anisometropic amblyopia varies depending on factors like patient's age, seriousness of amblyopia, compliance, and duration of treatment.

5.1) Traditional Treatment (Optical Correction, Patching, Atropine Penalization, and Active Vision Therapy):

Early intervention of traditional treatment (especially before the critical period of visual development, typically before 7–8 years of age) has a success rate of around **60–80%**. Refractive correction alone improves visual acuity in **30–50%** of mild-to-moderate cases. However, higher degrees of anisometropic amblyopia often require additional occlusion therapy or atropine penalization. The main challenges are patient compliance, cooperation, repetitiveness of amblyopia after stopping treatment, and comparatively poorer outcomes in young adults and adults.

5.2) Dichoptic Therapy:

Dichoptic therapy has conveyed promising results, especially in patients who is non-compliant to traditional treatment. Studies suggest the success rate is **50–85%.** It depends on compliance of treatment and the seriousness of amblyopia. It is especially beneficial in improving binocular function and stereopsis, which traditional treatments often fail to achieve. However, it requires skilled professionals (optometrists or ophthalmologists), patient cooperation, and specialized equipment, making accessibility and adherence challenging.

5.3) ICL (Implantable Collamer Lens) Implantation:

ICL treatment has been performed on those who either responded not well to other treatment like traditional methods or dichoptic therapy or for whom traditional treatments are not applicable. However, in anisometropic amblyopia, ICL is considered superior to other refractive error correction surgeries in terms of efficacy and safety. Studies report a success rate of **70–90%** in improving visual acuity, with significant long-term stability. However, it does not directly treat amblyopia but provides optical clarity, which can improve the effectiveness of other therapies. The main risks include cataract formation, increased intraocular pressure, and the need for long-term monitoring.

Overall, traditional treatment remains the **most used** and effective when intervened early. Dichoptic therapy is an optimistic alternative, particularly for improving binocular function. ICL implantation is an effective surgical management bonafide on high anisometropia beyond other treatments for better visual outcomes.

6. CONCLUSION:

The treatment of anisometropic amblyopia requires a customized strategy based on the severity of anisometropia, patient age, and treatment consistency. Traditional treatment methods, including remain the most widely used options, particularly in early intervention. They have exhibited high success rates but are often limited by adherence issues and the inability to fully restore binocular single vision. Dichoptic therapy suggests a modern alternative of other traditional method used to treat anisometropic amblyopia. It focuses on improving the binocular fusion and reduction of the suppression. It has shown optimistic prospects, particularly in cases where traditional methods fail or where stereopsis needs enhancement. However, its accessibility need for tailored apparatus and requirement for specialist guidance create obstacles to widespread adoption.

ICL implantation is as an effective surgical option for patients with high refractive errors who are intolerant to conventional corrective methods. While it does not directly treat amblyopia, it significantly improves visual acuity and gives a stable optical clarity, improving the impact of other amblyopia treatments. Ultimately a comprehensive approach that integrates conventional strategies with modern innovation such as dichoptic therapy and surgical interventions offers the greatest potential for maximizing visual recovery in anisometropic amblyopia.

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2. LITERATURE REVIEW:

Table: 2.1 (Improvement of visual acuity with Traditional Treatment in Anisometropic Amblyopia)

Author	Title	Age (Years)	Mode of treatment	Sample size	Before the treatment visual acuity	After the treatment visual acuity	Duration	Reference
Roy Shayeri et al.	Comparison of Dichoptic Therapy Versus Occlusion Therapy in Children With Anisometropic	5-15	Patching Therapy received on non-amblyopic eye 6 hours/day	28	0.70 ± 0.18 log MAR	0.49 ± 0.19 log MAR	3 months	32

	Amblyopia: A Prospective Randomized Study							
M.M.Rahaman	Visual outcome of occlusion therapy in anisometropic amblyopia	11-5	Patching received on non-amblyopic eye 6 hours daily for BCVA of log MAR 1, 4 hours for BCVA of log MAR 0.5 to 0.8 and 2 hours for BCVA of less than 0.5	100	0.88±0.28 log MAR	0.55±0.21 after 1 month, 0.42±0.15 after 3 months and 0.23±0.12 after 6 months	6 months	8
Alam mohammad et al.	Anisometropic Amblyopia: Analysis of treatment results with patching of dominant eye and refraction with active visual therapy in school age children	7-15	Patching of the non-amblyopic eye was done for 3 hours per day at the dose of one week along with refractive correction and active vision therapy has given to the amblyopic eye	41	In Snellen Chart 14 patients had BCVA (best corrected visual acuity) of 6/24, 8 patients had 6/36, 10 patients had 6/60 and 9 patients had CF (counting finger)	In Snellen Chart 10 patients had BCVA (best corrected visual acuity) of 6/6, 6 had 6/9, 7 had 6/12, 7 had 6/18, 4 had 6/24, 5 had 6/60 and 2 had CF (counting finger)	January 2016 to December 2018	9

Table: 2.2 (Improvement of Visual Acuity by Dichoptic Therapy in Anisometropic Amblyopia)

Author	Title	Age (Years)	Mode of treatment	Sample size	Before the treatment visual acuity	After the treatment visual acuity	Duration	Reference
Carolina Picotti et al.	Treatment of Anisometropic Amblyopia with a Dichoptic Digital Platform in Argentinian Children and Adults	6-60	All patients were treated with Bynocs@ platform following a protocol of 30 sessions of training of 30 minutes daily 5 times a week.	41	-5.50 to 6.75DS in dominant eye, -8.00 to 7.75DS in amblyopic eye, -3.75 to 0 DC in dominant eye and –6.00 to 0 DC in amblyopic eye	Improved by 0.10 log MAR or better than that.	6 weeks	11
Roy Shayeri et al.	Comparison of Dichoptic Therapy Versus Occlusion Therapy in Children With Anisometropic Amblyopia: A Prospective Randomized Study	5-15	All patients were played a dichoptic video game with adjusted contrast for 2 hours/day	27	0.74 ± 0.19 log MAR	0.53 ± 0.19 log MAR	3 months	32
Md OliullahAbdal et al.	Evaluation of the Efficacy of a New Dichoptic Digital Platform to Treat the Anisometropic and Isometropic Amblyopia	4-13	Dichoptic treatment with the Bynocs® platform was performed of training of 30 minutes daily 5 times a week	161	0.59 to 0.54 in non-dominant eye	0.20 to 0 in on-dominant eye	6 weeks	34

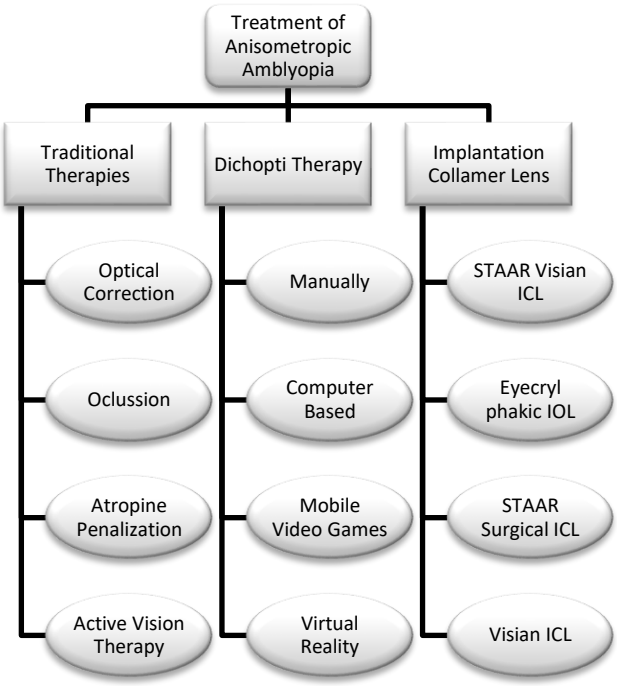
K Murali et al.	Binocular therapy as primary intervention in adults with anisometropic amblyopia	18-40	By using VisuoPrime software, patients played binocular games for 30 minutes in a day	29	0.60 ± 0.40 log MAR	0.45 ± 0.29 log MAR at 1 month, 0.38 ± 0.23 log MAR at 3 months	6 weeks	35

Table: 2.3 (Improvement of visual acuity by Implantation of Collamer Lens)

Author	Title	Age (Years)	Mode of treatment	Sample size	Before the treatment visual acuity	After the treatment visual acuity	Duration	Reference
Ahmed Abdelkareem Elmassry et al.	1 Year Follow up Implantable Collamer Lenses (ICLs) for the Treatment of Pediatric Anisometropic Amblyopia	2-15	Implantation of STAAR Visian ICL	12	UCVA 0.12±0.21 log MAR, BCVA 0.48±0.20 log MAR	UCVA 0.53±0.26 log MAR, BCVA 0.86±0.37	1 year	1
A.K Morya et al.	A clinical trial on panic intraocular lens for the treatment of refractive amblyopia in children and adolescents	10-19	Implantation of posterior chamber phakic intra ocular lens Eyecryl phakic IOL	23 eyes of 21 patients	UDVA 1.39±0.25 log MAR, BCVA 0.40±0.21 log MAR	UDVA 0.17±0.16 log MAR, BCVA 0.11±0.12	1 year	15
J Zhang et al.	Posterior chamber phakic intraocular lens for the correction of high myopic anisometropic amblyopia in adults	19.2-42.5	Implantation of ICL; model V4, Staar surgical Inc., USA	13	UDVA 2.5±0.5, CDVA 1.0±0.5	UDVA 0.5, CDVA 0.5±0	9 months	19

Eissa.S.A et al.	Management of pseudophakic myopic anisometropic amblyopia with piggyback VISIAN implantable Collamer lens	5-9	Sulcus implantation of the Visian ® implantable collamer lens	14	UCVA 0.11±0.07	After 12 months the improved UCVA 0.57±0.13, which remained same after 24 months	2	17
Jing. Z. et al.	Phakic posterior chamber intraocular lens for unilateral high myopic amblyopia in Chinese pediatric patients	7-15	Implantation of model V4, Staar surgical Inc.	11	CDVA 1.51±0.72	CDVA 0.75±0.40	8 months	24
Khalid. E. Emara et al.	Implantation of spherical and toric copolymer phakic intraocular lens to manage amblyopia due to anisometropic hyperopia and myopia in pediatric patients	5-15	Implantation of Visian ICL of toric and spherical model	11 (9 myopic, 2 hyperopic)	UDVA for spherical IOL is 20/150-20/600, UDVA for toric IOL is 20/60-20/400, CDVA for spherical IOL is 20/60-20/200, CDVA for toric IOL is 20/40-20/200	UDVA for spherical IOL is 20/30-20/125, UDVA for toric IOL is 20/25-20/100, CDVA for spherical IOL is 20/25-20/100, CDVA for toric IOL is 20/20-20/80	17 months	20

Flowchart 2.1:


Treatment of Anisometropic Amblyopia
Traditional Therapies
Dichopti Therapy
Implantation Collamer Lens
Optical Correction
Oclussion
Atropine Penalization
Active Vision Therapy
Manually
Computer Based
Mobile Video Games
Virtual Reality
STAAR Visian ICL
Eyecryl phakic IOL
STAAR Surgical ICL
Visian ICL