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Evaluation of new method in treatment of amblyopia between adults and children

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***Abstract*---**Amblyopia (lazy eye) is a condition of cortical visual impairment, clinically occurs as a unilateral or bilateral decrease of visual acuity (VA). Since the age of patients directly influence in the treatment of amblyopia. This study sought to evaluate the effectiveness of stimulator device in amblyopia treatment for children and adults in total 38 patients using stimulator at least one times weekly with follow up reached to 4 months**.** There was a significance differences in VA improvement using stimulator at ($P > 0.05$)**,** as well as there was a significance differences between two age group (younger age less than 13 years and older age more than 13 years) at ($P > 0.05$) that improvement increased in younger aged, Usage of vit. A tab during course of treatment enhance and accelerate the improvement of VA.

***Keywords*---**amblyopia, visual acuity, stimulator, tropia.

Introduction

Amblyopia (lazy eye) is a condition of cortical visual impairment, clinically occurs as a unilateral or bilateral decrease of visual acuity (VA), considered reversible visual loss arising from an insult to the developing visual system in early life common cause of visual loss (blindness) in children, affecting 2 - 3% of population blindness, and is considered as one of the most common causes of persistent unilateral visual impairment in adulthood (1,6). It is considered as a neurodevelopmental disorder of the visual system caused by abnormal binocular vision experience in early childhood (5). Several passive and active methods to treat amblyopia, occlusion of the dominant eye and forced use of the amblyopic eye is the most common method and the best treatment other methods including Treat any organic disease cataract or else, optical correction for refractive error or phormological treatment by cycloplogic in child age group (7). In Bilateral amblyopia encourage visual tasks that need similtonous use of both age, electronic device can serve for this purpose (4, 8). Age should be taken in consideration in treatment which directly affects the outcomes, formally children reach the age 7 years improvement rate of visual acuity becomes very slow and compliance with wearing a patch often becomes a major problem, while in older

ages, occlusion method could be effective if done correctly, but it is hard work and needs motivation (3).

Methods

Study participants and ethics statement

A retrospective study includes 38 patients with amblyopia in different age groups and different refractive error subjected to (simulator) Scessions to improve visual acuity and so life style quality. A simulator used at least once weekly with closing one eye respectively. V.A was recorded before and after using simulator in two situation with glasses and without glasses.

Exclusion criteria

In final results, the escaped patients were excluded from recommendation and conclusion

Statistical analysis

All data were expressed as mean _ SD and analyzed using SPSS 18.0 software (SPSS Inc., Chicago, IL). Differences between groups were assessed using Student's paired sample t-test and independent t-test.

Results

Patients demography

Retrospective study included 38 patients from both gender male 22/38 (58%) and female 16/38 (42%), age ranged (5–34) median age 13, Counting finger (C.f) is the most common initial VA in study samples which mean poor vision V.A for these patients less than 6/60, all patients using glass either with spher lenses, toric lenses or both and 37% of them with tropia either esotropia or exotropia, Hyperopia is the commonest refractive error in amblyopic patients and esotropia is the comments type of squint in amblyopic patients. There was a good percentage of arthotropia in amblyopic patient (40% of all patient), figure (1), table (1).

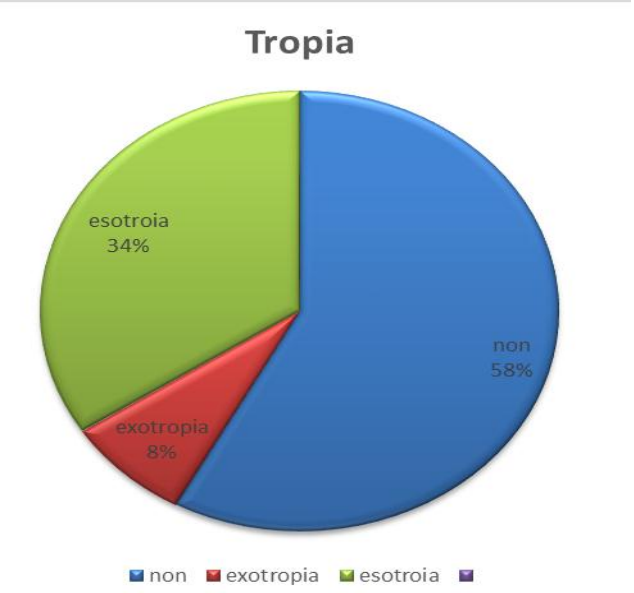

Figure (1): Percentage of patients with Tropia

Table (1):

no	gender	age	tropia	glasses	closure	Pre		post		Time
						Unaided eyes	Aided eyes	Unaided eyes	Aided eyes	
1	Female	13y	No	-2.75DC	4hr	R 6/18	6/18	6/18	6/6	2/w over 3mns
2	Male	13	eso.	+2.5 DS	-	R <6/60	6/60	6/36	6/18	2/w - 3m
3	Female	7	eso.	R+3.75 DS L +7 DS	6hr	L <6/60	6/60	6/24	6/18	2/w-3m
4	Male	24	No	(L) +2.00	6hr	L <6/60	6/36	6/36	6/18	1/w-6 w
5	Male	9y	eso.	+5.00 DS +6.00 DS	2hr each	L 6/60	6.24	6/24	6/12 p	2/w-3m
6	Female	13y	No	R-1.75 DC	3hr	6/36	6/12	6/9	6/6p	over 3 w
7	Male	12y	eso.	+4 DS +3.25DS	2hr	R <6/60 L 6/60	6.18 6/20	6/60 6/36	6/18 6/20	2/w-2m
8	Male	12y	Eso	R+2.00Ds L+2.25Ds	2hr	R 6/60 L 6/36	6/12p 61/2p	R 6/18 L 6/12	6/12 6/6	2/w - 12w
9	Male	6	Eso	(L) +2.00 DS	4hr	6.18	6.18	6/9	6/6p	2/w - 1m
10	Male	10	NO	L +1.75S/- 1 DC		L < 6/60	6/60	6/18	6/12 p	2/w - 2m
11	Male	5y	NO	R+3.25 L+3.5 DS	3hr each	R 6/24 L 6/24	6/18p 6/12	6/9 6/9	6/9 6/9	2/w-3m

12	Male	11Y	Eso	R + 1 DS/-3 DC	6hr	R < 6/60	6/18p	6/24	6/9	2/w - 3m
13	Female	14Y	Eso	+2S/-0.5DC	6hr	L 6/60	6/60	6/24	6/9p	2/w - 3m
14	Female	17Y	ESO	R +3DC L +2.5DC	2hr for each	R < 6/60 L < 6/60	6/36 6/24	6/24 6/18	6/9 6/9	1/w - 4m
15	Male	8Y	NO	L -1.25DS		L 6/12	6/9	6/9	6/6	1/w - 4w
16	Male	12	Exo	-2.00 DS Both eyes	2hr for each	R < 6/60 L < 6/60	6/60 6/24	< 6/60 < 6/60	6/18 6/6	1/w - 6w
17	Female	15y	No	-	6hr	R < 6/60	6/60	6/60	6/12	1/w - 5m
18	Male	23y	No	R -3.00 DS	NO	R < 6/60	6/60	< 6/60	6/12	1/w - 6w
19	Male	26	No	L +2.00 DS	NO	< 6/60	< 6/60	< 6/60	6/24	1/2 w - 3m
20	Female	18	ESO	R+1.75DS		< 6/60	< 6/60	< 6/60	6/36	1/w-1m
21	Female	15	Exo	R -0.75	3hr	R 6/24	6/18	6/18	6/9	1/w - 3m
22	Male	12y	No	-12 DS Both eyes	-	R < 6/60 L < 6/60	< 6/60 < 6/60	< 6/60 < 6/60	6/12 6/24	1/w-2m
23	Male	15y	No	L +2.00 DS	6h	L < 6/60	< 6/60	< 6/60	6/36	1/w-2m
24	Male	10y	No	+2/-2.5 Both eyes	2hr for each	R < 6/60 L < 6/60	6/36 6/24	6/18p 6/24	6/12 6/18	1/w-2m
25	Male	15Y	EXO BOTH	-1.5 DS/1.5DC Both eyes	2hr for each	R < 6/60 L < 6/60	6/18 6/24	< 6/60 < 6/60	6/9 6/9	1/w-6w
26	Female	12Y	NO	L+2 DS	-	L 6/36	6/24	6/36	6/18	1/w-1m
27	Male	17y	NO	+2.00 Ds	6hr	< 6/60	< 6/60	< 6/60	6/24	8w
28	Male	29y	NO	R-2.25C	-	R 6/18	6/18	6/18	6/6p	1/w-4w
29	Female	10	No	L+1.51/-2.5DS	6hr	L < 6/60	< 6/60	L 6/60	6/6	1/w - 6w

30	Male	25y	No	L +2.00 Ds	No	L < 6/60	< 6/60	6/60	6/6	Over 2m
31	Female	10y	Eso	R +1.75/-1.25DS	3hr	R 6/60	6/12	6/6	6/6	1/w-6w
32	Male	23y	No	R-3 DC	3hr	R 6.36	6/18	6/24	6/6 p	1/w-4w
33	Female	13y	NO	R 0.5/-1.00 L -1.00 DC	3hr	L 6/60	6/24	6/60	6.12p	2/w-2m
34	Female	12y	ESO	L -1.5/-2.5 DS	3hr	L < 6/60	6/12	6/9	6/9	2/w-3m
35	Male	9Y	No	R+1/-1.75DS	1hr	R 6/18	6/9	6/12	6/6p	2/w
36	Female	15y	No	R-9/-1.5 DS L -8.00 Ds	2hr for each	R < 6/60 L < 6/60	6/36 6/18	< 6/60 < 6/60	6/24 6/18	1/w -6 w
37	Female	23	No	R +2.5DS	6hr	< 6/60	< 6/60	< 6/60	6/36	1/w-2m
38	Female	34	No	L+2.5 DS	-	L.6/24	6/24	6/9	6/9	2M

R :right eye, L: left eye, w: week, m: month, hr: hours, DS: spher lenses, DC: toric lenses.

In this study there was a significance differences in VA improvement before and after using stimulator at ($P > 0.05$)**,** with improvement percentage 100% for all patients in both male and female in different ages but improvement increased in younger aged due to present a significance differences between two age group (younger age less than 13 years and older age more than 13 years) at ($P > 0.05$), final result ranges from (6/60 – 6/24) without glasses improvement from poor vision to moderate visual impairment and (6/18 – 6/6) with glasses improvement from moderate visual impairment to near-normal vision or normal vision. Older age group who a chief 6/6 undergo lasik and keep 6/6 without glasses. Some regression can occur months after cessation of simulator + closure so, it's good to keep regular follow up 3months after completion of treatment especially in younger patient till age of stabilization of refractive error and vision. There were more than 30 patients out of our recommendation and conclusion because they escape in first 2 cession, escaped patient usually with denser amblyopia who didn't achieve mentioned improvement is 1st cessions and usually from far living area.

Discussion

Amblyopia this type of dysfunction in eyes is the chief cause of preventable children blindness, with an incidence between 1 and 5% and it is still considered one of the main causes of unilateral visual impairment that persists in the adulthood, time of diagnosis of amblyopia usually at Teenage group school screening crucial for helping in well diagnose some cases. In this study first time reported in Iraq to improvement of VA in age group more than 12 years . A study in Texas (2015) to determine whether repeated binocular visual experience with dichoptic iPad games could effectively treat amblyopia in preschool children,

included 50 child age ranged between 3-6.9 years, they concluded that repeated binocular experience, provided by dichoptic iPad game play, was more effective than sham iPad game play as a treatment for amblyopia in preschool children (2). A study in Iran in 2019 included 68 patients to evaluate the effectiveness of CAM visual stimulation in amblyopia treatment for 7 - 20 years old patients, their results indicated that visual acuity was increased, and patients older than 7 years old have good chance to achieve successful treatment of amblyopia by this method. CAM visual stimulation could be suggested to patients with severe amblyopia (3). Many studies focused in improve VA in patients with amblyopia with by training eyes with different approaches including monocular training, included making tasks while the dominant eye is occluded, monocular videogames viewing, dichoptic therapy, perceptual learning using anaglyphs, lenticular screen, virtual reality, polarized lens, stereoscopes and other types of mechanisms used to improve binocular vision (e.g., , liquid crystal shutter glasses and video stereo-googles) all these technique were improve and enhance VA (9-28).

Conclusion

Simulator can improve the VA un ambylopia especially in younger people (Teenage) especially with usage of vit. A tab. or syrup, occlusion therapy and glasses all together. to keep regular follow-up after completion of treatment. School screening test for VA is helpful in diagnosis of ambylopia

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