Original Article

Preferred clinical practice in convergence insufficiency in India: A survey

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Purpose: Convergence insufficiency (CI) is a common binocular vision disorder. However, there is a lack of consensus regarding the treatment most appropriate for CI. The aim of the study was to investigate the treatment for CI by surveying the ophthalmologists regarding the most common treatment modalities used in India.

Materials and Methods: Four hundred questionnaires were distributed amongst ophthalmologists attending different sessions of the Delhi Ophthalmological Society annual conference held in April 2007. Two hundred and three ophthalmologists responded (response rate 50.75%). The responders included 109 private practitioners, 57 consultants attached to teaching institutes and 37 residents.

Results: The majority of ophthalmologists (66.7%) claimed encountering >5% outpatient department patients with CI. Pencil push-ups therapy (PPT) was the most common first line of treatment offered by ophthalmologists (79%) followed by synoptophore exercises (18%). Only 3% referred the patients to optometrists. Thirty per cent ophthalmologists claimed good results with PPT, which was significantly higher in private practitioners (35%). Only 26% ophthalmologists explained physiological diplopia to patients on a regular basis and reported significantly higher percentage of patients (46.3%) with good results. Only 12.3% ophthalmologists needed to refer >30% patients for synoptophore exercises. For failure of PPT 86.7% considered lack of compliance as the major reason as perceived by ophthalmologists.

Conclusions: This survey suggested that most ophthalmic practitioners prescribed PPT as the initial treatment for CI and had satisfactory results with PPT. The majority of the practitioners did not explain to the patient about physiological diplopia. Explaining physiological diplopia may improve outcome, as perceived from the survey.

Key words: Convergence insufficiency, near point of convergence, orthoptic exercises, vision therapy

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Convergence insufficiency (CI) is a common problem (2 to 8%).[1-3] Different modalities of exercises such as home exercises, pencil push-ups therapy (PPT), use of prisms and lenses, jump vergence are used for treatment. Different types of orthoptic exercises with the use of lenses, prisms, synoptophore are prescribed. The condition can be treated passively if the exercises fail and symptoms are quite severe. Relieving prisms (base-in) for near work can also be prescribed. However, despite being a common problem there are only a few studies which compare different modalities of treatment. Also, there is a lack of information regarding the preferred practice amongst the ophthalmologists.

Scheiman *et al.*,[4] conducted a survey among optometrists and ophthalmologists in the United States. The results suggest that the most common treatment prescribed by optometrists was PPT (36%) followed by home-based vision therapy (22%) and office-based vision therapy (16%). For the ophthalmologists, the most common treatment prescribed was PPT (50%) followed by home-based vision therapy (21%) and base-in prism (10%).

There is no such survey of Indian ophthalmologists to our knowledge. The purpose of this survey was to investigate the most common treatment modalities for CI used in India.

Materials and Methods

The study was conducted during the Delhi Ophthalmological Society annual conference held in April 2007. The majority of the ophthalmologists belonged to Delhi and the northern states of India. Four hundred questionnaires [Table 1] were distributed amongst ophthalmologists attending different sessions and 203 ophthalmologists responded (response rate 50.75%). The responders included 109 private practitioners, 57 consultants attached to teaching institutes and 37 residents. Total number of members of the Delhi Ophthalmological Society is 4000. Four hundred constitute 10% and 203 respondents constitute 5.07% of the total members.

The data was analyzed using SPSS 11.5 for Windows. Descriptive statistics was derived and chi-square test was used.

Results

Thirty four per cent ophthalmologists claimed >10% patients in the outpatient department (OPD) with CI requiring treatment, while 22.7% ophthalmologists suggested that they attend to 6-10% OPD patients with CI [Table 2]. Patients of CI presented

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Table 1: Survey questionnaire

Designation	Fair 20-50%
Private practitioner	Good 50-70%
Consultant at teaching institute	Excellent >70%
Resident	How long do you give Pencil push-ups
How commonly do you get patients with convergence	(duration per day and number of weeks prescribed)
insufficiency	5 min/day
Rare	10 min/day
1-2%	15 min/day
3-5%	20 min/day
6-10%	
>10%	2-4 weeks
What is the commonest complaint?	4-6 weeks
(more than one answer can be ticked)	6-8 weeks
Headache	>8 weeks
Strain	Any other
Diplopia	Do you explain to the patient about
Any other mention	physiological diplopia?
How do you diagnose convergence insufficiency?	No, not heard of
Only symptoms	Sometimes
Symptoms with receded NPC[#]	Always
Symptoms + reduced fusion range	How many patients do you refer for
Symptoms + receded NPC + fusion range	synoptophore exercises?
What is your first line of treatment	Don't have facility…
Pencil push-ups treatment	<10%
Synoptophore exercises	10-30%
Refer to optometrists	30-50%
Any other treatment	>50%
Do you prescribe placebo drugs with exercises?	What do you think is the cause for failure of treatment
Yes	Exercises are not effective
No	Lack of compliance
What are the results with pencil push-ups?	It is mainly a psychogenic problem
Very poor <20%	Any other

[#]NPC - near point of convergence

Table 2: Outpatient department patients of convergence insufficiency (%)

		% of outpatient department patients					Total
		Rare	1-2%	3-5%	6-10%	>10%	
Designation	Private practitioner	7	15	28	24	35	109
	Consultant	0	6	19	14	18	57
	Residents	3	6	4	8	16	37
Total		10	27	51	46	69	203
		4.9%	13.3%	25.1%	22.7%	34.0%	100.0%

to ophthalmologists with major symptoms of eye strain (75.3%) and headache (71.4%). Diplopia, blurring of vision, near reading problem, confusion between lines accounted for 10.3% of complaints according to the ophthalmologists [Fig. 1]. For diagnosis all the ophthalmologists used symptoms as criteria. Of the ophthalmologists, 42.4% measured near point of convergence (NPC) as well as fusion range (FR) along with symptoms, while 9.9% used FR and 39.9% measured NPC for diagnosis in addition to symptoms. Only 7.9% relied merely on symptoms to diagnose CI.

Pencil push-ups therapy was the most common first line of treatment (78.8%). While 17.7% ophthalmologists relied on synoptophore exercises as the first line of treatment, only 3.4% ophthalmologists referred patients to the optometrist for prescribing treatment [Table 3]. Of the ophthalmologists

23.2% had no access to synoptophore. Amongst others, 12.3% ophthalmologists referred >30% patients for synoptophore exercises and the rest (64.5%) referred less than 30% patients for synoptophore exercises.

Thirty per cent ophthalmologists reported good results in patients treated with PPT. Fifty-one per cent experienced fair results and only 19% suggested poor results. Private practitioners claimed significantly better success rate (34.9% having good or excellent results) than consultants and residents ($P = 0.016$). Duration of exercises given was 5 min per day by 33.5%, 10 min per day by 33% and 15 min or more by 33.5% ophthalmologists. The majority of the ophthalmologists (81.3%) gave exercises for ≥ four weeks.

Physiological diplopia was explained to every patient by only 26.6% ophthalmologists. While 55.2% ophthalmologists sometimes explained, 18.2% had never heard of physiological diplopia. Those who explained physiological diplopia on a regular basis reported significantly higher percentage of patients (46.3%) with good results as compared to those who sometimes explained (29.5%) and those who never explained (5.4%) ($P = 0.001$) [Fig. 2].

For failure of PPT 86.7% ophthalmologists claimed lack of compliance as the major reason [Fig. 3]. While 54.8% ophthalmologists used placebo drugs, 45.2% did not use any, but there was no significant difference in the results.

Discussion

Convergence insufficiency is a failure of the normal fusional ability of the eyes to maintain singular binocular vision of any object at working distance. Duke-Elder[5] defined CI as a condition with symptoms associated with NPC > 9.5 cm (from the apex of cornea) and FR < 30°.

Duke-Elder[5] gave a detailed account of treatments given for CI. He found satisfactory results with described PPT. Other modalities include synoptophore, use of lenses, bead strings, aperture rule, stereograms. In case active exercises fail, passive treatment with base-in prisms is also suggested but not found to be effective.[6]

Despite being a common problem there are only a few studies evaluating and comparing different treatment modalities.[7-13] The data about actual preferred modalities by practicing ophthalmologists is not available. There is only one survey available of preferred clinical practices amongst ophthalmologists and optometrists in the United States.[4] The

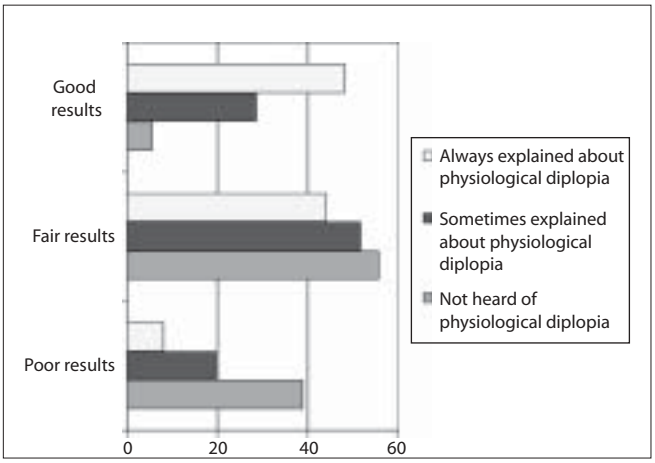

Figure 2: Percentage of practitioners who explained about physiological diplopia and success rate

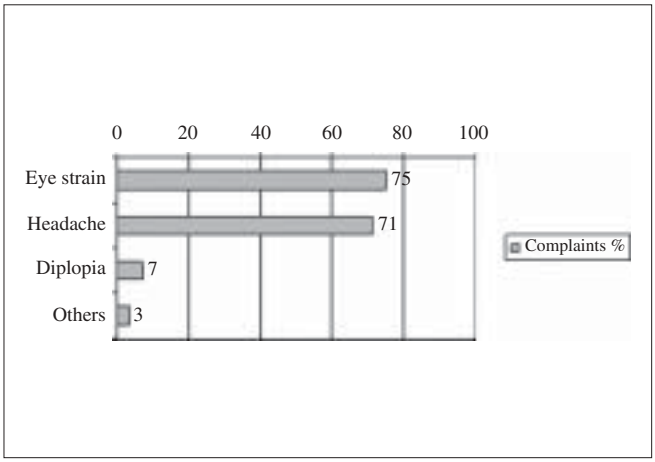

Figure 1: Common complaints of convergence insufficiency

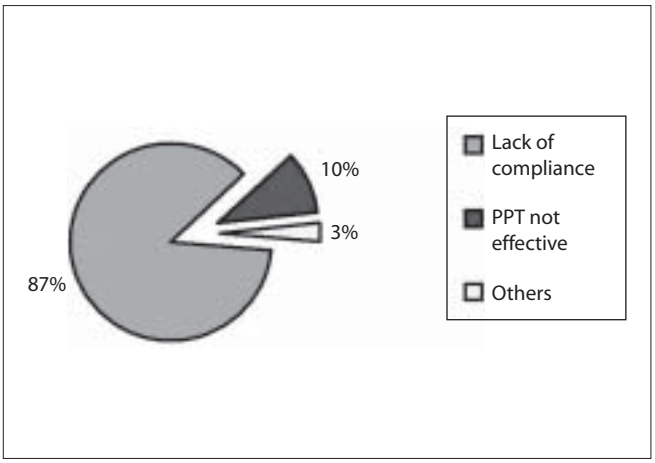

Figure 3: Causes of failure of pencil push-ups treatment (PPT)

Table 3: First line of treatment

		First line of treatment			Total (%)
		PPT* (%)	Synoptophore (%)	Refer to optometrist (%)	
Designation	Private practitioner	92 (84.4)	14 (12.8)	3 (2.8)	109 (100.0)
	Consultant	41 (71.9)	14 (24.6)	2 (3.5)	57 (100.0)
	Residents	27 (73.0)	8 (21.6)	2 (5.4)	37 (100.0)
Total		160 (78.8)	36 (17.7)	7 (3.4)	203 (100.0)

*PPT - Pencil push-ups therapy

results of that survey suggested that for the ophthalmologists, the most common treatment prescribed was PPT (50%) followed by home-based vision therapy (21%) and base-in prism (10%). The present survey is the first such survey in India.

The survey confirmed that CI is a common problem as perceived by ophthalmologists with 66.7% respondents suggesting >5% of OPD patients with CI which is in agreement with previous studies claiming 2-8% incidence, though it is merely an estimate.[1-3] The criteria for diagnosis were variable amongst ophthalmologists signifying lack of consensus amongst ophthalmologists regarding the diagnosis of CI.

Pencil push-ups therapy was used most commonly as the first line of treatment for CI (78.8% ophthalmologists). Only 3.4% ophthalmologists preferred to refer the patient to the optometrist, which indicated that in India the problem of CI was mainly handled by the ophthalmologists rather than optometrists. Only 19% of the ophthalmologists claimed poor results with PPT. The success rate was claimed to be significantly higher when patients were treated by private practitioners (34.9%). This could be because of more time spent with the patient while explaining the exercises and more motivation of the patients.

Those who explained physiological diplopia on a regular basis claimed significantly better results as compared to those who sometimes explained and those who never explained (P = 0.001) This is a very important finding of the study. Of the ophthalmologists, 73.4% did not consider explaining physiological diplopia as an integral part of convergence exercises. This indicated lack of consensus and knowledge about PPT amongst the ophthalmologists which translated into poorer results than expected.

The majority of the ophthalmologists (86.7%) believed that poor compliance is the major cause of failure of PPT. This concern has been repeatedly raised by many investigators. There was no significant difference in the perceived results among those who used and did not use placebo drugs. This suggested that CI is not merely a psychogenic problem which can be treated by placebo therapy.

Synoptophore exercises are a good alternative to PPT, but 23.2% ophthalmologists had no access to synoptophore. Among others, despite having access to synoptophore, only 12.3% referred >30% patients for synoptophore exercises.

Since this survey is based on the perception of the responders and not on actual data, recall bias remains its major limitation, as with any other survey. Despite the limitation it provides the only source of information about the clinical practice amongst private practitioners, consultants and residents.

Conclusions

This survey showed the perception of ophthalmologists that a high proportion of OPD patients complained of CI. There was lack of consensus and knowledge amongst the ophthalmologists regarding the method of prescribing PPT, though PPT was the most common first line of treatment (78.8% ophthalmologists). Synoptophore is considered a good alternative to PPT, but there was relative unavailability of instrument.

Explaining to the patient about physiological diplopia might result in improved success. Lack of compliance is a major cause of failure of exercises as believed by the ophthalmologists. Spending more time explaining to the patient the right way to do the exercise and emphasis on compliance may improve the success of treatment.

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