Spring 1971

The value of caecanometry in charting blind spot restrictions for the diagnosis of infections in the head and neck region

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Abstract

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Degree Type

Thesis

Degree Name

Master of Science in Vision Science

Committee Chair

D.T. Jans

Subject Categories

Optometry

THE VALUE OF CAECANOMETRY IN CHARTING BLIND SPOT RESTRICTIONS FOR THE DIAGNOSIS OF INFECTIONS IN THE HEAD AND NECK REGION

by

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Submitted in Partial
Fulfillment of the
Requirement for the
Degree:
Doctor of Optometry

Approved D. T. Jans

Spring 1971

ACKNOWLEDGEMENT

We extend our appreciation to D. T. Jans O.D. and to B. R. Lemire D.D.S. for their assistance in the preparation of this thesis.

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PURPOSE

It is our hope that this research project will offer a series of case studies in an effort to emphasize the value of taking caecanometric findings in cases where restrictive blind spots may be indicative of patients hosting focal or infections in the head and regions which may have a pathological and/or functional effect on the eye.

It is likewise hoped that by setting forth some of our experiences and opinions that we may encourage others in the field and related fields to discover this diagnostic procedure that relates blind spot restriction to focal or drainage type infections.

By means of this technique the optometrist has been able to offer some patients a unique service and a degree of help that perhaps otherwise would not have been available to them.

INTRODUCTION

The research that preceded and succeeded the development of the caecanometer covered a period of eight years and involved over 3,000 control patients. These 3,000 control cases showed that the area within the blind spot does, in the presence of certain types of infection, show a constriction in its plotted size as compared to the normal or expected average area; that such a restricted area always regains its own normal size when the source of infection has been eliminated. These cases likewise showed that a restriction of the blind spot almost invariably accompanies cases of infections above the shoulders.[1]

You may wonder how this data relates to optometrists. These are the patients who come to you with complaints of photophobia; discomfort during the use of the functions of accommodation and convergence; excessively altered phorias and ductions, lowered night-vision, unequal acuity of the two eyes; and complaints of unclear vision in spite of 20/20 vision. These patient's complaints, where infections above the shoulders are present, may be partially eased by optometric therapy but will never disappear completely until the source of infection is found and removed.

REVIEW OF LITERATURE

The oral cavity possess a number of potential loci for infections that can and do cause very severe visual and ocular involvements. These vary from reduced vision to chorioretinitis to complete blindness. Several examples of these potential loci are infected teeth, old roots, infections of the gums and alveolar processes. The data on dental involvement has been divided into two categories: (1) alveolectomies, and (2) all forms of exodontia (tooth extractions). A large number of dental involvements are complicated by also having sinus involvements. But the following data that was studied represented dental involvements only.

Exodontia data are complicated by a number of factors. Among these are: number of teeth to be extracted, severity of the infection, extent to which the infection has been walled off by the body, recuperative power of the individual, secondary infections, and length of time following exodontia that the blind spots were plotted. Some of the plottings in the data analyzed were secured within hours of the post extractions; others, by as much as a week. No attempt was made to analyze the course of the changes from post-exodontia to complete recovery. A survey of the data indicated that the changes in the size of the plotted blind spots could be quite variable, depending upon the degree of interference with the reparation process by secondary infections.

Exodontia resulted in complete success, that is 0% constriction in 64.8% of the plotted blind spots. Partial success was indicated in 37.7% of the blind spots. This meant an average reduction of the constriction. Two answers seem plausible for these partial successes. They are: the reparation time was not complete by the time of the last plotting, or another locus of infection was present, such as a mild sinus involvement.[2]

An alveolectomy is an excision of a portion of the whole of the alveolar process. The data here was only available in a frequency distribution, but it was concluded that the reparation time following an alveolectomy seems to be somewhat on the order of a week or less. All cases reported, which totalled 17, were completely successful.[3]

A basal condition for caeconometry is to chart the patient in as nearly his first awakening situation as is clinically practical. The patient should be advised to arise in the morning, dress slowly, do absolutely nothing to exert himself, to not brush his teeth, to abstain from food, beverages, or smoking, and to not use his eyes any more than he absolutely must. If the patient has exerted himself in reaching the doctor's office, he should be given a period of rest before the charting is taken.

Under this type of condition, the reduction of the area of the plotted blind spot is generally greater than a blind spot charted under non-basal conditions.

The comparison of the non-basal and a basal charting will find a dental case changed very little, while the case which is principally sinusitis; i.e., no other toxic or pathologic involvement, will usually have 8 to 25% greater restriction on a basal charting. According to Davidsen, the reason for this is that the cells of the sinuses are like a honeycomb and collect their purulence in the night. As soon as the patient arises in the morning, this begins to drain into the system and the toxic effects are at their greatest thirty minutes after rising.[4]

For a more definitive test for dental involvement, the following routine is suggested. A basal plotting of the physiological blind spot is made. The patient is given at least two large sticks of gum to chew vigorously for <u>exactly</u> fifteen minutes and is again charted. The reason for the gum chewing is to pump any toxemia from around the tooth roots, sockets, and gingival tissue. If the dental foci are involved, the charting will show an increased restriction after this "provocative test".[5]

With regard to differential diagnosis, a flattening of the superior or inferior portion of the plotted nerve-head and is found in approximately 80% of severe tonsil involvements. This flattening may be straight across or tilted. The greater the constriction in the vertical, the more apparent is the flattening. When the vertical constriction is less or there is a corresponding constriction in the horizontal, the flattening is less obvious as a flattening and may give the plotted nerve-head a distorted appearance. When the latter condition exists, there is usually a considerable difference in the shape of the two charted nerveheads. Occasionally, but rarely, the flattening may appear on one side. Generally, the side of the throat coinciding with the eye displaying the greater nerve-head constriction will be found to have the greater infection.[6]

When there is a greater constriction on one plotted nerve-head than the other, a dental involvement should be suspected. A size difference of -7% of the area of constriction between the right and left eye is often indicative of this type of condition. Sinus involvements will also create differences, however, usually not as great.[7]

After sufficient reparation time, if the recoveries are at -10% or less, the findings would be clinically significant even if the standard (0%) may not had been attained.

PROCEDURE

The patient is seated with face in the instrument, a Davidsen-Wottring Caeconometer, Model #75, Series 156.

Spectacle correction may be worn during the testing.

Non-basal conditions were in effect.

The room illumination is dimmed. The level of illumination on the caeconometer chart was medium and this was controlled by a dial on the instrument.

The occluder, which is an integral part of the instrument, is applied over the left eye and the patient is told to fixate the orange spot of light with the right eye.

The patient is told to retain fixation on the orange spot of light at all times. The test object, a .69 millimeter steel sphere, is then placed on the chart. The test object is remotely controlled from beneath the instrument charting table by a magnet. The procedure was to move the test object from visible to invisible.

The patient is asked to continue fixation on the orange light and to signal by a "pencil tap" when the steel ball disappears. This procedure is continued until the eight primary meridia are charted.

The occluder is then applied to the right eye and the procedure is repeated for the left eye.

The figure on page 11 shows a typical picture of dental involvement. This charting was done before therapy was administered to patient #3. The dark outline represents the average blind spot and the white shaded area shows the size of the patient's plotted blind spots taken with a .69 millimeter steel ball test object from visible to invisible -- this type of charting technique from visible to invisible is the unique feature in plotting these constrictions.

After the primary meridia are charted, the horizontal and vertical meridians are then measured in millimeters and translated to minus percentages through the use of a table attached to the instrument. This table is based on the mathematically calculated reduction of area for an ellipse.

R -30 % Davidsen - Wottring Caecanometer Chart L -61 %

DATE 3-3-71 TIME 12:00 PATIENT'S NAME #3 PRESCRIPTION NO.

BASAL - NON BASAL T. O. 1.59 MM 1.0 MM .5 MM .79 MM LEVEL OF ILLUMINATION LO. MED. HI.

WISDOM -
HURTS WORSE
ON LEFT SIDE

AGE 26
MALE
NO Rx

ORGANIZATION OF DATA

The following data was gathered from a total of eleven subjects; seven males and four females. The ages ranged from twenty-one to fifty-three in the female group, and twenty-three to sixty-six in the male group.

The subjects with the dental problems were referred by an oral surgeon on the basis of teeth being extracted due to an abscess or due to wisdom tooth problems. Also, a person with dental caries was referred to observe if any constriction occurred.

Five of the subjects were referred by the infirmary at Pacific University. These were for infections such as a sore throat or a head cold.

One subject came to the Optometry Clinic for lens therapy, but the therapy was rejected and it was found the patient had an infection diagnosed as sinusitis. A subsequent visual examination was given after a physician had indicated the infection had been eliminated.

The results of this investigation are presented in tabular form on Table I on the following two pages.

TABLE I

PATIENT	COMPLAINT	DIAGNOSIS	SIZE OF PBS* BEFORE TREATMENT O.D.	O.S.	TREATMENT	SIZE OF PBS* AFTER TREATMENT O.D.	O.S.
1	Vision blur when threading a needle	Sinusitis	-75%	-36%	Medication	-4%	0%
2	None	Severe head cold	-40%	-38%	Sleep, fluids, pills	0%	0%
3	Blurry vision when reading sometimes	Wisdom involvement	-30%	-61%	Extraction	0%	-7%
4	None	Abscessed tooth	-73%	-26%	Extraction	-5%	0%
5	None	Head cold with sinus involvement	-52%	-48%	Sleep, fluids, pills	-6%	-3%
6	None	Mild sore throat	-44%	-32%	Lozenges and fluids	-4%	0%

* Physiological blind spot

TABLE I (con't)

PATIENT	COMPLAINT	DIAGNOSIS	SIZE OF PBS* BEFORE TREATMENT O.D.	O.S.	TREATMENT	SIZE OF PBS* AFTER TREATMENT O.D.	O.S.
7	Headaches	Bad sore throat	-58%	-46%	Lozenges and fluids	-5%	0%
8	Headaches on right side and blurry vision when reading	Infected tooth	-82%	-43%	Extraction	-6%	0%
9	None	Cavity	-28%	-32%	Filling	0%	0%
10	Severe headaches at left temporal region	Wisdom involvement	-66%	-83%	Medication	-4%	-10%
11	Headaches on left side	Wisdom involvement	-36%	-68%	Extraction	0%	-7%

* Physiological blind spot

SUMMARY AND CONCLUSIONS

In all the cases studied there was a diagnosis of infection localized in the head and neck region. All showed a significant decrease in the measured physiological blind spot. The average for the right eye was -53% with a range of -28% to -82%. For the left eye the average was -46.6% with a range of -26% to -83%. After medication and/or appropriate treatment the average for the right eye was -3.09% with a range of 0% to -6% and for the left eye the average was -1.7% with a range of 0% to -10%. These recovery values were less than the -10% restriction considered significant. This leads to the conclusion that infections in the head and neck region or the area above the clavicles do result in a significant reduction in the size of the blind spot since the elimination of such infection virtually restores the blind spot to normal size. Case #9 involving dental caries showed a moderate restriction and a complete restoration after filling. This was an unexpected result.

Six of the cases studied experienced subjective symptoms. Four complained of headaches and three complained of blurred vision at near. One of the three that complained of blurred vision at near also complained of headache. All the cases that experienced headaches and/or visual symptoms reported relief of their complaints after institution of proper treatment.

The authors believe that the blind spot charting technique developed by Ingwald O. Davidsen, and referred to as caeconometry, is a great contribution to optometry. Its value in the detection and location of focal infection is a great help to patients, especially those who otherwise are the most difficult.

Caeconometry has great diagnostic value because its differential signs are distinct and should be classed with such instruments as the ophthalmoscope in determining if a patient should have the additional services of other healing art professions. In some patients, the effect of toxemia produced by infections of the cephalic region can in a few severe cases be detected around the nerve-head with the use of the ophthalmoscope. But in the majority of cases the caecanometer seems almost infallible in apprehending the presence of infections above the clavicles whether the infection be acute or chronic.

Although optometrists are not too concerned about different modes of treatment, they are, as guardians of vision, alert to detect any loss of visual performance. Since infections in the head and neck region may have just such an effect, we have at our disposal an optometric procedure in caeconometry that can help us ascertain the cause and within the scope of our practice, help to eliminate it.

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