

Changes of ocular signs in children with thyroid diseases after bee bread intake

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The objective of the study was to investigate visual acuity, refractive status and eye proptosis in children with thyroid diseases before and after the intake of bee bread.

The investigations of visual acuity refraction and eye proptosis were done in 34 children with thyroid diseases (age range from 6 to 17 years) at the Eye Clinic of the Lithuanian University of Health Sciences Medical Academy. Eighteen patients used bee bread and underwent low-frequency pulsed electromagnetic field therapy. For 16 subjects, electromagnetotherapy alone was performed. The values were statistically compared with the pretreatment values after a three-week course of treatment.

In the present study, we observed an improvement of visual acuity in children with thyroid diseases who used bee bread, and magnetotherapy was performed to compare with those who underwent magnetotherapy alone. In our study, changes of exophthalmometric values and refraction power were not significant in both groups.

Data analysis indicated an increase of visual acuity in subjects who used bee bread and pulsed electromagnetic field therapy to subjects who did not use bee bread. Our data suggest that bee bread and magnetotherapy have influenced visual acuity in children with thyroid diseases.

Introduction

Children with thyroid disease (thyrotoxicosis, diffuse or nodular goiter) may have proptosis, decreased visual acuity, refraction changes, palpebral retraction. In such patients, the development of proptosis and a decrease of vision are caused by the proliferation of retrobulbar fat and connective tissue, increased extent of extraocular muscles [1]. In children with hyperthyrosis, eyelid manifestations are frequent, and eyelid retraction is most common [2], mostly those of myopia [3].

Myopia is more common among children and teenagers with thyroid diseases. There was noted a myopic shift following orbital decompression in progressive thyroid-associated ophthalmopathy [4].

There have been a lot of discussions about the relationship between nutrition and vision. Many scientists, ophthalmologists and public health specialists are working on discovering the exact mechanisms by which bee products affect vision. It is therefore necessary to improve vision by different methods of treatment. Many studies and clinical trials over the last 20 years have proven that many kinds of food can prevent or delay the progression of certain eye disorders.

Bee products are well known in traditional medicine and have a very long history. Reactive oxygen species play the key role in many physiologic and pathogenic processes.

Many ophthalmologic diseases seem to be mediated, at least in part, by oxidative stress [5, 6].

In patients with thyroid-associated ophthalmopathy, visual acuity may decrease due to compression of enlarged extraocular muscles, corneal and refraction changes [7].

Bee bread is rich in vitamins, protein, amino-acids, carbohydrates, minerals and microelements and has a positive influence on people's health [8]. Its beneficial effects are due to the lactic acids, vitamins (A, B₁, B₂, B₃, B₆, B₁₂, C, PP, E, D, K), beta-carotene, minerals and microelements bee bread contains [9]. The most important nutrients essential to eye disorders are vitamins A, C and E, the antioxidants, some essential fatty acids and zinc as a microelement. An adequate intake of bee bread can help delay the progression of existing eye disorders and lower the risks of developing more serious eye conditions. In addition, bee bread protects the eye tissue cells from damage caused by free radicals and ensures the proper functioning of all eye structures [10].

Bee bread is very easy to be absorbed in the intestinal tract. Pulsed electromagnetic field is one of the important modalities of magnetotherapy and is useful in the treatment of various disorders [11].

There are no studies about the usage of bee bread in patients with thyroid diseases and problems of visual acuity, refractive status and eye proptosis.

The objective of the study was to investigate visual acuity (VA), refractive status and eye proptosis in children

with thyroid diseases before and after the intake of bee bread.

Materials and methods

The investigations were done in 34 children with thyroid diseases at the Eye Clinic of the Lithuanian University of Health Sciences, KMA (age range from 6 to 17 years, the mean age 12.48 ± 4.1 years). The group of children with thyroid diseases included 26 girls and 8 boys; 22 children were hyperthyroid, 8 euthyroid, 4 hypothyroid. Inclusion criteria: patients with hyperthyroidism, hypothyroidism, Graves' ophthalmopathy. Exclusion criteria: patients with ocular and other endocrine and systemic diseases. Eighteen patients used bee bread (1 teaspoon twice daily for 3 weeks), and for then low frequency pulsed electromagnetic field therapy was performed (group A). For 16 subjects, magnetotherapy alone was performed (group B). A low-frequency electromagnetic field apparatus "Polius-3" (POMA, Lvov, Ukraine) was employed with magnetic induction of 20 mT, rate 25 Hz, exposure 10–15 minutes, 10 sessions per course. The procedures were done with the apparatus directly to the eye area.

The ocular examination included measurements of visual acuity, slit-lamp investigation, exophthalmometry with Hertel's exophthalmometer in mm, objective refraction using retinoscopy; myopia was defined as a spherical equivalent (SE, sphere power +0.5 cylinder power). Emmetropia was defined as a refractive status between +0.25 D and -0.25 D. Myopia was characterized as a refractive error at -0.50 spherical equivalent or more.

Statistical analysis was conducted using statistical SPSS 18.0 software package (Version 16.0). The following statistical characteristics were calculated for the continuous values: average \pm SD. Nominal variables were presented as percent ages. To compare continuous variables, the t-test and McNemar criteria were used. *P* values less than 0.05 were considered statistically significant. The values were statistically analyzed with the pretreatment values after a three-week course of treatment.

Results and discussion

The final examination of 18 children who used bee bread and underwent low frequency pulsed electromagnetic field therapy revealed an improvement of visual acuity (Table 1).

Table 1. Summary of baseline VA, end of treatment VA

Patients	Baseline (before treatment) VA Mean \pm SD	End of treatment VA Mean \pm SD
Group A	0.76 \pm 0.15	0.83 \pm 0.12
Group B	0.78 \pm 0.21	0.82 \pm 0.18

In children with thyroid pathology, the mean of best corrected visual acuity before treatment was 0.76 ± 0.15 (range 0.5 to 1.0); after the observation period of one

month including bee bread and electromagnetic field therapy (group A), the average visual acuity increased to 0.83 ± 0.12 (range, 0.5 to 1.0). In children with thyroid pathology, the mean best corrected visual acuity before the electromagnetic field treatment alone (group B) was 0.78 ± 0.21 (range, 0.5 to 1.0), and after the electromagnetic field therapy course visual acuity improvement was not significant -0.82 ± 0.18 (range, 0.5 to 1.0).

Among patients who used bee bread and received electromagnetic field therapy, 27.78 % reported an improvement in their vision by two rows on the visual acuity eye chart in both eyes (Table 2).

Table 2. Improvement in VA in children with thyroid diseases

	Group A	Group B
Average improvement in VA	0.07	0.04
% of patients who improved VA by 2 lines or above in both eyes	27.78	12.5
% of patients who improved VA by 2 lines or above in one eye	5.56	6.25

In children with thyroid diseases, we found most commonly the myopic spherical equivalent. The mean spherical equivalent in such children was -1.6 ± 2.64 D, range -5.5 to $+3.0$ D; after the treatment with bee bread and low-frequency pulsed electromagnetic field therapy (group A) it changed to -1.57 ± 2.62 D, range -5.5 to $+3.0$ D (Table 3). The mean spherical equivalent in children with thyroid diseases was -1.73 ± 2.59 D, range -5.25 to $+3.0$ D; after the treatment with pulsed electromagnetic field therapy (group B) we observed the average spherical equivalent to be -1.66 ± 2.54 D, range -5.0 to $+3.0$ D.

Table 3. Spherical equivalent in children with thyroid diseases before and after treatment

Patients	Baseline (before treatment) spherical equivalent D Mean \pm SD	End of treatment spherical equivalent D Mean \pm SD
Group A	-1.6 ± 2.64 D	-1.57 ± 2.62 D
Group B	-1.73 ± 2.59 D	-1.66 ± 2.54 D

The Hertel exophthalmometry in children showed that proptosis ranged from 13.0 to 21.5 mm, mean 17.11 ± 2.62 mm, and after treatment with bee bread and low-frequency pulsed electromagnetic field therapy (group A) the proptosis did not change (16.97 ± 2.65 mm), range 13.0 to 21.5 mm (Table 4); the average of the change in proptosis was 0.14 mm. In 22.22 % of patients proptosis improved in both eyes (Table 5). Proptosis before magnetotherapy alone was 17.25 ± 2.42 mm (from 13.5 to 21.0 mm), and after treatment (group B) it was not significant by changed (17.0 ± 2.34 mm, range 13.0 to 21.0 mm). In 12.5 % of patients who received magnetotherapy alone, proptosis improved in both eyes.

Table 4. Proptosis in children with thyroid diseases before and after treatment

Patients	Baseline (before treatment) Proptosis, mm Mean \pm SD	End of treatment Proptosis, mm Mean \pm SD
Group A	17.11 \pm 2.62	16.97 \pm 2.65
Group B	17.25 \pm 2.42	17.0 \pm 2.34

Table 5. Improvement of proptosis in children with thyroid diseases

	Group A (18)	Group B (16)
Average improvement in proptosis (mm)	0.14	0.25
% of patients with improved proptosis in both eyes	22.22	12.5
% of patients with improved proptosis in one eye	11.11	18.8

In the present study, we have observed an improvement of visual acuity in children with thyroid diseases who used bee bread and received magnetotherapy in comparison with those who were treated with magnetotherapy alone. In our study, the exophthalmometric values and refraction power changed not significant by in both groups of patients.

This study shows that bee bread and magnetotherapy are effective in improving visual acuity in thyroid diseases, but not effective in improving the refraction status and proptosis. There were no adverse reactions in children with thyroid diseases who used bee bread. Our observations allow the conclusion that bee bread helps achieve therapeutically valuable results in the treatment of thyroid-associated ophthalmopathy.

In the current literature, we have not found investigations on the influence of bee bread on visual acuity, proptosis and refractive changes in children with thyroid diseases.

S. A. Phillips et al. (2001), K. Frank-Raue et al. (2004) show that on excess of thyroid hormones has an influence on the development of myopia [12, 13]. According to our study, in children with thyroid diseases we noted a myopic spherical equivalent. It may be due to the effect of thyroid hormones on the tonicity of the ciliary muscle and remodeling of the eye ball.

There are few articles about eye changes in children with thyroid diseases. In patients under the age of 18 years (range, 3–16 years, mean age 14.5 years) with Graves' disease, ocular signs such as proptosis, palpebral retraction are described [14].

In patients with thyroid diseases there may be refraction changes; they may be due to the immune complexes in the orbit tissues and extraocular rectal eye muscles [15].

Many investigators show a positive effect of pulsed electromagnetic field therapy on the microsoft-tissue, organism, metabolism, and inflammation [16–18]. It reduces inflammation, swelling of the extraocular muscles and fat tissue. Electromagnetic field therapy manipulations

are not effective in later stages when rectal muscles are fibrotic or atrophic.

Jankauskiene et al. (1998) have reported that in adults with endocrine ophthalmopathy pulsed electromagnetic field procedures improved the state of oedema of the eyelids, chemosis and injection of the conjunctiva, reduced exophthalmos [19]. Vainshtein et al. (1983) showed a positive effect of magnetic field therapy on proptosis and the swelling of eyelids [20].

Bee bread is efficient in blood cerebral circulation, cardiac disturbances, metabolic disorders [8]. Bee bread strengthens the immune system, treats microcirculatory problems, vitamin deficiencies. These supplements can be used as a preventive measure to eliminate toxic elements from the body, to treat metabolic disorders [9].

In our study, an improvement of visual acuity was observed after a course of therapy with bee bread and a pulsed electromagnetic field. Bee bread can be recommended together with pulsed electromagnetic field procedures in patients with thyroid diseases and eye disorders.

Conclusions

The data of our study showed an increase of visual acuity in children with thyroid diseases and visual disorders who used bee bread and received pulsed electromagnetic field therapy as compared to patients who were treated by electromagnetotherapy alone. The data of exophthalmometry and refractive power did not change in both groups of patients.

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VAIKŲ, SERGANČIŲ SKYDLIAUKĖS LIGOMIS, AKIŲ POŽYMIŲ POKYČIAI VARTOJANT BIČIŲ DUONĄ

S a n t r a u k a

Tyrimo tikslas buvo įvertinti vaikų, sergančių skydliaukės ligomis, regos aštrumą, refrakcijos būklę ir akių išverstakumą prieš vartojant bičių duoną ir ją pavartojus.

Lietuvos sveikatos mokslų universiteto Medicinos akademijos Akių ligų klinikoje buvo atlikti regėjimo aštrumo, refrakcijos ir akių išverstakumo tyrimai 34 vaikams (nuo 6 iki 17 metų amžiaus), sergantiems skydliaukės ligomis. 18 pacientų vartojo bičių duoną, jiems buvo atlikta ir žemo dažnio impulsinio elektromagnetinio lauko terapija. 16 asmenų buvo atlikta tik elektromagnetoterapija. Duomenys buvo statistiškai analizuojami prieš gydymą ir po trijų savaičių gydymo kurso.

Buvo nustatytas padidėjęs regėjimo aštrumas sergančių skydliaukės ligomis vaikų, kurie vartojo bičių duoną, jiems buvo atlikta magnetoterapija, palyginti su tais, kurie buvo gydomi tik magnetoterapija. Atliekant tyrimą, išverstakumo dydis ir refrakcijos būklė abiejose grupėse nebuvo reikšmingai pasikeitę.

Duomenų analizė parodė padidėjusį regėjimo aštrumą vaikų, kurie vartojo bičių duoną ir kuriems buvo atlikta impulsinio elektromagnetinio lauko terapija, palyginti su tais, kurie nevartojo bičių duonos. Nustatyta, kad bičių duonos vartojimas ir kintamo magneto terapija turi įtakos vaikų, sergančių skydliaukės ligomis, regos aštrumui.