ORIGINAL RESEARCH

Effect of the Toftness Chiropractic Adjustments for Children with Acute Otitis Media

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ABSTRACT

BACKGROUND: Recurrent acute otitis media occurs during the early years of life in approximately 20 to 30% of the pediatric population. A clinical challenge closely related to recurrent otitis media is persistent otitis media, manifested by persistence during antimicrobial therapy of symptoms and signs of middle ear infection and relapse of acute otitis media within 1 month of completion of antibiotic therapy. Recurrent acute otitis media is often associated with morbidity, temporary hearing loss, and financial costs. The aim of this study was to study the effect of Toftness chiropractic adjustment for acute otitis media in children.

METHODS: Twenty-two children who had acute otitis media and received no prophylaxis were treated with Toftness chiropractic adjustment.

RESULTS: Among the 21 children, 9 were females and 12 were males, ranging in age from 9 month to 9 years old. Examination revealed consistent findings of acute inflammation in the inner ear with red and bulging tympanic membrane and an increased mean oral temperature of >100°F. After the Toftness chiropractic adjustment, the red and bulging tympanic membrane returned to normal in 95% of the children and a decrease in average oral temperature to 98.6°F ± 0.774.

CONCLUSIONS: The consistency of the results provides evidence that patients with otitis media may benefit from the Toftness chiropractic adjustment. The small number of subjects and the cohort study design limit the conclusions that can be made from this data. However, this data is clearly strong enough to justify a larger, more well-controlled clinical trial to determine the extent of efficacy of Toftness chiropractic adjustment at treating this widespread childhood condition.

Key Indexing Terms: *Toftness; Chiropractic; Otitis media, Subluxation*

INTRODUCTION

Current medical management of otitis media is geared toward the eradication or removal of the bacteria in the middle ear. Antibiotics are the first line of defense. Lack of reduction in symptoms after 48 to 72 hours, usually leads to a second line of antibiotic being used to treat antibiotic resistant organisms or B-lactamase producers. If no response is seen after the course of these two antibiotics, the next treatment of choice is tympanostamy (tube placement used to drain the middle ear and equalize pressure). Finally, if none of the above treatments is effective, adenoidectomy is the last line of defense.[1,2]

Isaacson[3] opens his research article with, "The accurate diagnosis of acute otitis media is difficult, especially in the early hours. The vague symptoms and subtle physical signs of early otitis media leads to many diagnoses by default and to issue too much treatment out of caution. With the growth of resistant organisms limiting the effectiveness of safe, low cost antibiotics, there is an increasing pressure to prescribe antibiotics more sparingly."

As stated previously, after antibiotics, the next step to resolve otitis media is tympanostamy. A study of children sixteen years and younger with otitis media found that of the 6429 children to receive the procedure, 42% were appropriate, 35% were equivocal and 23% were inappropriate.[4] In a study conducted by Rosen of 5400 children, one of the conclusions they arrived at was that the placement of tube in the middle ear is of no value as a primary treatment procedure nor in the combination with antibiotic therapy for the initial treatment of otitis media. Another conclusion was that the aggressive use of antibiotics will accelerate the emergence of bacteria that are resistant to treatment.

This confusion is furthered by a study of 250 family physicians and 175 pediatricians that showed that the treatment procedures varied considerably especially among family physicians. Family physicians referred for tympanostamies three times more often, prescribed high cost antibiotics 1.5 times more often, and

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used antihistamines and decongestants more often that their pediatrician counterparts would.[6]

There is a direct relationship between the Eustachian tube, the middle ear and the tensor veli palantini (TVP) muscle, and the superior cervical ganglion. The TVP is the only active opener of the Eustachian tube. If this is hindered completely, the middle ear is not allowed to drain and accumulates fluid[9].

A possible key to the pathogenesis of otitis media can be traced to the action of the TVP muscle and its control over the opening and closing of said Eustachian tube. The mandibular branch of the trigeminal nerve innervates the TVP muscle. Also, the levator veli palantini and salphinglopharyngeus muscles are directly attached to the cartilaginous portion of the tube, and facilitate opening of the tube by releasing tension[10]. The pharyngeal plexus, which also innervates the superior pharyngeal constructor muscle, innervates all of these muscles. This muscle is also in the close proximity to the auditory tube and is involved by way of facilitation. Misalignment of the C1 vertebra would not only affect components of the previously discussed superior cervical sympathetic ganglion, but also effects the tonus of the TVP. It would also affect the vagus nerve and the inferior vagal ganglion since these are in close proximity to the C1 area. This would mean that since the inferior vagal ganglion innervates the pharyngeal plexus the possibility of hyper-depolarization and the resultant contraction of the levator veli palantini, salphingorpharyngeus, and the superior constrictor muscles, and secondary closure of the Eustachian tube. The C1 adjustment would restore normal neurological function of this area. This would allow natural drainage and release of negative pressure of the middle ear[11].

In 1989 two hundred pediatricians and two hundred chiropractors were surveyed as to the effectiveness of their respective treatments against otitis media. The results showed that chiropractic treatment resolved 69% of the cases versus 20% by pediatricians[7]. A retrospective study conducted by Froehle showed improvement in 93% of the cases in which chiropractic was used, with 73% in ten days or less and 43% of these cases resolving within one or two treatments showing significant improvement[8]. However, the treatment effect might have been affected by the spontanouse remission of otitis media. A study with two hundred twenty-two children who had recurrent acute otitis media and received no prophylaxis were monitored for subsequent acute otitis media and the development of chronic otitis media with effusion. The results showed that only 4% of the 222 infants with recurrent acute otitis media developed chronic otitis media with effusion and an additional 12% continued having recurrent episodes. The most significant factor predicting an increased risk of recurrence was young age (< 16 months of age)[18].

The Toftness System of Chiropractic Adjusting is a low force technique that incorporates two devices, the Toftness Contact Locator (TCL) for detection of proposed abnormal electromagnetic radiation created by the body, and the Toftness Applicator (TA). The TCL is a useful though non-validated device that can either be hand held for scanning purposes, or mechanically supported by an adjustable arm for adjusting purposes. The adjustment contact line of drive (LOD), amount of force applied (measuring by the TA), and duration of the contact are determined by constant monitoring of the adjustment site with the TCL, the utility of which is directly related to the practitioner's experience with the device. The Toftness technique is partially based upon the theory of facilitation and the physiological effects thereof. Given the above information one might expect to find a definite correlation between the actions of certain muscles of the middle ear and upper cervical subluxations and otitis media.

The purpose of the study is to determine the response to Toftness chiropractic adjustment in children with acute otitis media.

MATERIAL AND METHODS

1. General: Before the initiation of this study, all aspects of the protocols were subjected to review and approval by the Institutional Review Board (IRB) of Logan College of Chiropractic. This pilot study involved the use of Informed Consent documents and procedures for this study were approved by the IRB. One examination doctor and one adjusting doctor were involved in the study.

2. Subjects: Subjects were recruited through newspaper ads and from local chiropractor's offices. Children included in this study suffered from acute otitis media for less than 2 months and were under the age of 10. Children excluded from this study were free of neurological impairment (as determined by the TCL) and/or had chronic otitis media (over 2 months). Also excluded were children under active medical treatment for their otitis media and any individuals with perforated eardrums, cardiac infarction, heart failure, osteoporosis or bone pathology or individuals who did not comply with the written informed consent form.

3. Outcome Assessment:

Subjective Clinical Assessments: All subjects were examined (baseline and follow-ups) by a licensed doctor of chiropractic for the condition of the tympanic membrane as observed via an otoscopic examination. The color was noted along with any fluid levels or bulging of the membrane.

These observations were made at the first and last visit and as necessary in between. The inspecting doctor also rated the color and severity of the otitis media. Examining doctor performing post-baseline examinations were blinded to earlier examination sheets until their evaluation has been made. At that time the exam doctor compared their findings with previous data sheets to establish progress of the patient, observing any changes and reporting clinical results immediately to the treating doctor for possible outside consultation. Indicators of improvement included a decrease in tension of the membrane, return of the normal membrane color, and decrease in fluid levels. The normal color of the membrane is a pearly-gray. A non-treating doctor documented the severity of the symptoms using a scale from 0 to 10 (0 = no symptoms, 10 = very severe).

Objective Clinical Assessment - The admitting doctor recorded the oral temperature (^{o}F) of the patient using conventional thermometer.

4. Chiropractic Adjustment: The practitioner delivered a low force (2-32 oz.) Toftness chiropractic adjustment by a metered

hand-held pressure applicator at the cervical, thoracic, lumbar and sacral contact site [16,18]. This applicator is a rubber-tipped, spring-loaded device that indicates the amount of force that is being applied at the contact site. The adjustment contact line of drive, amount of force applied and duration of the contact are determined by constant monitoring of the adjustment site with the TCL.[16]

5. Statistical analysis: All continuous data were expressed in mean ± SD. A paired Student t-test was used for the pre and post comparisons of continuous variables. An alpha level of <0.05 was considered significant.

RESULTS

1. Demographics of Participants. Among the 21 children with otitis media in the study, 9 were females and 12 were males, ranging in age from 9 month to 9 years old (Table 1).

2. Clinical presentations: All subjects recruited in the study showed acute inflammation of the inner ear. The examination results are shown in Table 1, 2. The red and bulging tympanic membrane returned to normal in 95% of study subjects after Toftness chiropractic adjustments (Table 1).

3. Oral Temperatures: Pre-treatment oral temperature (100 °F) was decreased to an average of 98.6 °F after the Toftness chiropractic adjustments (P<0.01) (Table 2).

DISCUSSION

This study investigated the effect of Toftness chiropractic adjustments on children with otitis media. This is the first study on otitis media using the Toftness method of chiropractic adjusting. Previous studies on the Toftness Technique have indicated clinical significant results with patients with NMS conditions[13], and also with patients exhibiting Chronic Tension Headaches and Dysmenorrhea[12].

The children in this study presented with severe red and budging tympanic membrane in the middle ear and moderate fever that improved after three to six adjustments during a study period of fourteen calendar days. Although significant improvement of the symptoms were found in the study, it is possible that some of the improvements were spontaneous resolution in the natural healing process. Frei and Thurneysen[16] had shown that homeopathy treatment was more effective than the spontaneous resolution and cost less than medical treatments in a study

Table 1. Patient demographic and treatment outcomes

Patient Number	Age of Patient	Sex of Patient	Initial Symptom Reading	Final Symptom Reading	Initial Temp. (°F)	Final Temp. (°F)	Number of Adjustment
101	5 y	F	8	0	98.9	98.8	5
102	28 m	M	6	0	101.2	99.1	4
103	9 m	F	8	0	101.2	99.1	4
104	18 m	F	10	0	96.3	97.1	5
105	19 m	M	6	0		98.8	5
106	47 m	M	5	0		98.8	4
107	10 m	F	6	0	101.6	98.2	5
108	10 y	M	8	0	102.6	98.3	3
109	42 m	M	8	3	98.0	98.0	5
110	9 y	F	8	0	97.3	97.1	5
111	10 m	M	8	0	102.3	99.6	5
112	4 y	F	8	0	102.1	99.2	5
113	20 m	M	8	0	101.8	98.9	6
114	13 m	F	9	0	102.6	99.1	5
115	13 m	M	9	2	101.7	99.6	6
116	13 m	F	7	2	95.2		5
117	16 m	M	5	0	95.8		3
118	16 m	M	7	0			4
119	16 m	F	7	1	98.9		4
120	17 m	M	8	0			5
121	9 m	M	9	0	102.5		4

Table 2. Oral temperature and severity of symptoms of children with otitis media treated before and after Toftness chiropractic adjustments.

	Oral Temperature (°F)		Severity of Symptoms (0-10)	
	Initial	Final	Initial	Final
Mean±SD	100.0±2.612	98.6±0.774	7.524±1.327	0.429±0.870
Count	17	15	21	21
t-test	p<0.01		p<0.01	

involving two hundred and thirty children with acute otitis media.

Toftness chiropractic adjustment in children with otitis media is non-invasive treatment. It has been documented that not all children with otitis media require antibiotic treatment. Palmu et. al.[17] found that in otitis media with a negative tympanometric peak pressure, 71% of bacterial cultures remained negative for the main pathogens, compared to 36% in matched controls ($P<0.001$) in a clinical trial involving 329 infants. They also found that Streptococcus pneumoniae and Haemophilus influenzae were rarely found in samples from negative pressure ears. They concluded that if otitis media is diagnosed with negative tympanometric peak pressure negative middle ear bacterial culture for the main pathogens is highly probable. They suggested that expectant follow-up might be more appropriate than routine antibiotic treatment.

It has also been documented[18,19] that not all children with acute otitis media will run a natural healing process. These children often developed chronic otitis media for many years if they did not receive treatment. In this study, the results showed that the recovery from otitis media from all 21 children were consistent in their clinical presentation. Fever was reduced in all children as well as significant improvement on the red and bulging tympanic membrane. During the study period, no side effects or deterioration of clinical presentations were found among the 21 children with otitis media.

There were several limitations in the study. The cohort study design used did not require a control group. It was felt more appropriate in this pilot study to have all children to receive active chiropractic adjustments. The importance of having a control group in an experimental study and the lack on one in this study is noted. Clearly, the follow up to this study, given the positive results seen, will be a larger, more carefully controlled study comparing this technique to other forms of otitis media treatment. The second limitation in this study was the small sample size. Although it was found that patient's symptoms were improved after Toftness chiropractic adjustment, a definitive conclusion on the overall effectiveness of this treatment could not have been drawn from the study due to the small sample size.

CONCLUSION

This study provides evidence that the Toftness System of chiropractic adjusting is a technique that can provide relief to subjects experiencing otitis media. This data warrants further study to ascertain the effectiveness of Toftness chiropractic adjustments in patients with otitis media.

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