

**A COMPARATIVE STUDY OF THE RELATIVE EFFECT OF SPINAL MANIPULATION
AS OPPOSED TO ACUPUNCTURE TREATMENT IN THE MANAGEMENT OF
CHRONIC SINUSITIS**

by

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I, Nicole Descoins, do hereby declare that this dissertation
represents my own work in both conception and execution.

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DEDICATION

This work is dedicated to my family and friends, who believe in me.

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ABSTRACT

Purpose

The purpose of this investigation was to compare the relative effect of spinal manipulation as opposed to acupuncture treatment in order to determine a more effective approach in the treatment of chronic sinusitis.

It was hypothesized that chiropractic treatment and acupuncture treatment would both be effective in the treatment of chronic sinusitis. However, it was proposed that the chiropractic treatment would be more effective than acupuncture treatment.

Methods

This randomized controlled trial consisted of two treatment groups. Each group consisted of fifteen subjects, over the age of fifteen years old, selected from the general population and randomly allocated to treatment group A or B, participation in this trial was purely voluntary. For the purpose of this study, chronic sinusitis was defined as that of more than six months duration.

Group A received chiropractic treatment, while group B received acupuncture treatment. Subjects in both groups had to comply with various inclusion criteria before being allowed to participate in the study. Each individual had a case history taken from them, and underwent a relevant physical examination and a regional examination of the cervical spine. Questionnaires designed by the author were answered at the initial consultation, at the end of the four week treatment period and lastly, at the one month follow-up.

Two tailed statistical analysis was conducted at $\alpha = 0.05$, using the non-parametric Wilcoxin Signed Rank Test and the Mann-Whitney U Test comparing intra-group and inter-group data respectively. Further assessment of the data was conducted using power analysis. This data as well as the descriptive statistics were presented in tables and charts.

Results

Statistically significant results ($p < 0.025$) were noted for both treatment groups, between the initial and the final treatment and between the initial and the one month follow-up, with respect to the subjective data. For the objective data over the same time frames, group A (chiropractic) and group B (acupuncture) showed no statistically significant difference, though it must be noted that the power was weak; so the probability of committing Type II error and falsely accepting the null hypothesis is high.

Conclusions

Both treatment groups responded equally well to the interventions. It can be suggested from this pilot study that both chiropractic and acupuncture treatment have a positive impact on reducing chronic sinusitis symptoms suffered by these patients. Further studies into these interventions are warranted.

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LIST OF ABBREVIATIONS

CT	Computerized Tomography
St	Stomach
Li	Large intestine
L	Lung
GB	Gall Bladder
CV	Conception Vessel
SD	Standard deviation
SE	Standard error
P value	The observed significance of the test

DEFINITION OF TERMS

Acupuncture: (Acus = needle, punctura = to penetrate)

The insertion of needles into the body for the relief of pain and therapeutic purposes. (Dorlands, 1988).

Acupuncture treatment:

For the purpose of this study it consisted of stomach 2 and 40, large intestine 20 and 4, lung 7, gall bladder 14, conception vessel meridian 24, auriculo points 13, 16, 31 and 33 (Schafer, 1996:62-64).

Adjustment:

Specific form of direct articular manipulation utilizing either long or short leverage techniques with specific contacts, characterised by a dynamic thrust of controlled velocity, amplitude and direction. (Gatterman 1990: 405)

Chiropractic:

Chiropractic is a discipline of the scientific healing arts concerned with the pathogenesis, diagnostics, therapeutics and prophylaxis of functional disturbances, pathomechanical states, pain syndromes and neurophysiological effects related to the statics and dynamics of the locomotor system, especially of the spine and pelvis (Bryner, 1998).

Chiropractic treatment:

For the purpose of this study it consisted of spinal adjustments to the cervical region and thoracic region. eg. C1, C2, C3, T1 and T2 (Schafer, 1996:62-64).

Contraindication:

Any condition, especially any disease condition, that renders one particular line of treatment improper or undesirable (Gatterman, 1996).

Cun:

The unit of measure along the meridians of the body, specific to that particular individual. One cun (or body inch) being the width of the individuals' thumb nail. (Stux and Pomeranz, 1995:78).

Fixation:

Absence of motion of a joint in a position of motion, usually at the extreme of such motion. (Gatterman 1990:408)

Homeostasis:

The level of well-being of an individual maintained by internal physiologic harmony (Haldeman, 1992:623).

Joint dysfunction:

Joint mechanics showing area disturbances of function without structural changes; subtle joint dysfunctions affecting quality and range of joint motion. They are diagnosed with the aid of motion palpation, and stress and motion radiography investigation. (Haldeman, 1992:623).

Manipulation:

Passive maneuver in which specifically directed manual forces are applied to vertebral and extravertebral articulations of the body, with the object of restoring mobility to restricted areas. (Gatterman 1990:410)

Meridians:

Energy lines on the body that correspond to the energy flows within the body according to the theory and practice of classical acupuncture. (Stux and Pomeranz, 1995:67)

Sinus:

A cavity or channel such as the air cavities in the cranial bones (paranasal sinuses) or dilated channels for venous blood (Solomon et al. 1990).

Sinusitis:

This is an inflammatory disease of maxillary, ethmoid, frontal and sphenoid sinuses, derived directly from the infection of nasal mucosa or caused by the poor drainage of sinuses due to the blockage of their orifices. At the acute stage only one sinus is involved, but at chronic stage, more than two sinuses may be involved.

Subluxation:

An aberrant relationship between two adjacent articular structures that may have functional or pathological sequelae, causing an alteration in the biomechanical and/or neurophysiological reflexions of these articular structures, their proximal structures, and/or body systems that may be directly or indirectly affected by them (Haldeman, 1992:627).

CHAPTER 1

1.0 INTRODUCTION

1.1 The problem and its setting

In 1981, 31 million persons (approximately 13% of the population) were reported to have had chronic sinusitis by the United States Department of Health and Human Services. Approximately 1,5 million working days are lost each year in Great Britain due to sinusitis. (Slavin, 1988.)

Over the last decade, respiratory disorders have become more prevalent in our society, amongst which chronic sinusitis is one of the most common. Chronic sinusitis is an inflammation of the paranasal sinuses due to viral, bacterial or fungal infections or due to an allergic reaction. (Slavin, 1988.)

The most significant diagnostic feature of chronic sinusitis is a dull ache due to pressure experienced in the maxillary, ethmoidal or sphenoid sinuses. The headache usually occurs daily, for weeks at a time, and is aggravated by movement. (Loch et al. 1990.)

The patient will also commonly complain of a thick pharyngeal secretion (postnasal drip) and "popping ears" or otalgia. Fevers and rigors are reported in less than 65% of the cases. (Loch et al. 1990.) Other symptoms include itchy eyes as well as recurrent sneezing if the sinusitis is associated with allergic rhinitis.

Fatigue is a characteristic complaint, commencing with lack of energy, concentration and productivity. The patient may also present with a cough that usually occurs at night shortly after lying down, lasting one to two hours, and resuming in the early morning. (Godley, 1992.)

Sinusitis is, however difficult to diagnose accurately on the basis of symptoms alone and imaging tests are often necessary to confirm the presence of infection (Thistlethwaite, 1998).

Antibiotics are usually the treatment of choice for sinusitis. However, if the patient is unresponsive, surgery is usually suggested (Huerter, 1992). Surgery is carried out to correct obvious nasal pathology such as polyps or deviated nasal septa and especially for suspected malignancy (Thistlethwaite, 1998).

1.2 Aims and Objectives of the study

Aims:

The aim of this study is to evaluate the relative effectiveness of spinal manipulation as opposed to acupuncture treatment, in terms of subjective and objective clinical findings in order to determine a more effective approach in the treatment of chronic sinusitis.

Objectives:

- 1) To evaluate the relative effect of spinal manipulation as opposed to acupuncture treatment in terms of subjective clinical findings in the treatment of chronic sinusitis.
- 2) To evaluate the relative effect of spinal manipulation as opposed to acupuncture treatment in terms of objective clinical findings in the treatment of chronic sinusitis.

3) To integrate the results obtained from objectives one and two in order to determine the more effective treatment protocol.

1.3 Benefits of this study

The treatments explored in this study could provide a possible alternative to more invasive treatment protocols currently used.

An extensive review of the literature revealed little information pertaining to the treatment of chronic sinusitis through acupuncture or spinal adjustment therapy. The benefits of this pilot study should contribute to the expansion of knowledge pertaining to chronic sinusitis as well as providing alternative effective treatment options.

It must be emphasized that this is a pilot study. What the author hopes to achieve is to point toward possible relevance and the understanding in the treatment of chronic sinusitis.

CHAPTER TWO

2.0 REVIEW OF THE RELATED LITERATURE

2.1 Introduction

Chronic sinusitis is an inflammation of the paranasal sinuses due to viral, bacterial or fungal infections, or allergic reaction (Slavin, 1988). 'Sinusitis', better described as facial pain and congestion, is one of the several conditions that present regularly as recurrent and can be extremely difficult to manage (Van Schaik *et al.*, 1997).

The sinuses are mucosa-lined cavities in the skull communicating with the nasal cavities. There are four pairs of sinuses, namely: the ethmoidal, frontal, maxillary and sphenoid sinuses. The frontal and maxillary sinuses are more prone to infection and inflammation. (Maciocia, 1994.)

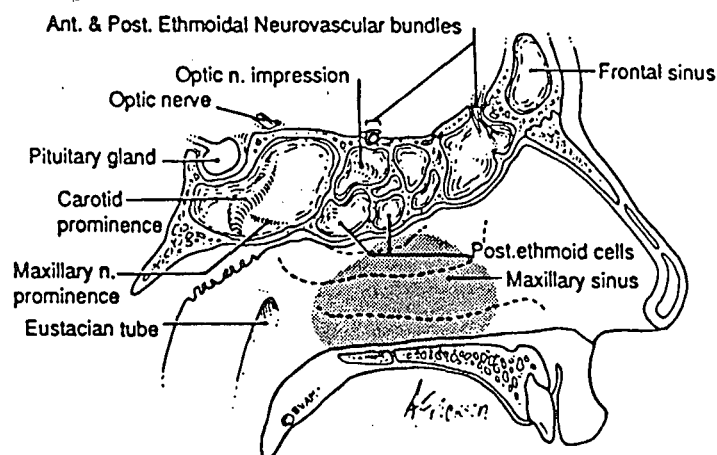


Figure 2. The anatomy of the nose in the sagittal plane.

Failure of ventilation and drainage are the predisposing factors for the development of sinusitis (Thistlethwaite, 1998). Due to its complex anatomy, the osteomeatal unit is frequently obstructed, leading to disruption of the ciliary and mucosal blanket functions. The process is what is commonly termed today as chronic sinusitis. (Reilly, 1990).

2.2 Incidence and Prevalence

Sinusitis may occur at any age but is generally most common during middle age (Thistlethwaite, 1998). In 1981, 31 million persons (approximately 13% of the population) had sinusitis in the United States and 1,5 million working days were lost each year in Great Britain due to chronic sinusitis (Slavin, 1988). Sinusitis has been reported to be the source of 35-65% of subdural abscesses (Josephson, 1991).

2.3 Aetiology

Most cases of sinusitis follow a viral upper respiratory tract infection. Altered mucociliary clearance and swollen mucous membranes cause obstruction of the sinus ostia, leading to a stasis of mucus, which may then undergo secondary bacterial infection. Obstruction in the osteomeatal complex region of the middle meatus gives rise to secondary infection in the major paranasal sinuses. (Grant, 1998.)

Causal organisms include viruses, pneumococci, haemophilus influenzae, hemolytic streptococci, staphylococci and occasionally fungi, the last usually occurring in the immunocompromised. Dental apical infections may cause anaerobic infections. (Grant, 1998.)

Other causes of sinusitis are certain environmental irritants such as tobacco smoke or chemicals such as chlorine in swimming pools. The bacteria cultured from purulent sinusitis secretions was found to be similar to those of otitis media. About 67-88% of these organisms found are anaerobic. (Josephson, 1991.)

Resolution of sinus infection is often slow and incomplete, so that when the next viral infection from a common cold or influenza occurs, the already infected and inflamed sinuses will be affected again, thus, leading to chronic sinusitis (Maciocia, 1994).

Branches of the trigeminal nerve are widely distributed to the mucosal surfaces of the paranasal sinuses. If there is acute or chronic inflammation of the sinuses, afferent fibers of the trigeminal branches are stimulated and this causes some sensation of pain. This is the main mechanism behind the commonly experienced sinus headache. (Takeshima et al. 1988.)

Rachelefsky (1989) suggests that abuse of topical nasal decongestants, immune deficiency (especially IgA deficiency), structural abnormalities and asthma may all contribute to the initiation of chronic sinusitis.

According to Maciocia (1994), a well known acupuncturist and medical herbalist, excessive consumption of greasy hot foods leads to phlegm and may predispose an individual to the development of sinusitis.

Pathogenic factors in traditional Chinese medicine are: wind, heat, cold or damp. It is also common experience of patients that changes in weather especially cold and wind will precipitate an attack. (Brom, 1996).

Summary of the aetiology of sinusitis according to Godley (1992).

Common causes

- Allergies
- Complication of acute or chronic rhinitis
- Environmental irritants (eg. tobacco smoke etc.)
- Nasal polyposis (eg. asthma, aspirin intolerance)
- Viral infections

Less common causes

- Barotrauma
- Benign and malignant neoplasms
- Churg-Strauss syndrome (eosinophilic vasculitis)
- Cystic fibrosis
- Dental infection
- Downs syndrome
- Fungal infections
- Immobile cilia disorder
- Immunodeficiency disorder
- Sarcoidosis
- Surgical packing
- Trauma or foreign body impaction
- Wegener's granulomatosis

2.4 Pathophysiology

The function of the sinuses is not entirely understood. They are mucosa lined air pockets which drain into the middle meatus of the nasal cavity. These pockets are lined by ciliated columnar epithelium which moistens the inhaled air. The cilia beat $1,00 \times$ per minute and transport the mucous through the ostium into the nasal cavity, from here the mucous is actively transported posteriorly into the nasopharynx and then swallowed. (Godley, 1992.)

The cilia have been shown to beat the mucous in a very specific pattern towards the natural sinus ostium. Most of the bacteria are destroyed by the lysozymes in the nasal mucous and the residual bacteria are destroyed by gastric juices in the stomach. The mucous glands of the nose and the paranasal sinuses normally produce approximately 600 - 700 ml of secretions daily. Chronic sinusitis is characterized by thickened sinus mucosa with inflammatory cells and proliferation of goblet cells, which produce a more viscous mucous. (Josephson, 1991.)

The mucous captures foreign airborne particles and removes them from the inspired air. The sinuses also act as shock absorbers and impart resonance to the voice. (Rachelefsky, 1989.) When the osteomeatal unit becomes obstructed it can result in ciliary and mucosal blanket function to become disrupted, resulting in the accumulation of mucous secretions and inflammation with subsequent bacterial contamination (Reilly, 1990).

Often the inflammation blocks passageways and increases pressure on the sinus walls. This results in symptoms such as headaches, fever, discomfort, dizziness, pain and difficulty in breathing. (Solomon et al. 1990.)

The mucociliary apparatus protects the paranasal sinuses against infection. Mostly bacteria gain access to the sinuses via the ostia, but occasionally dental abscess can cause bacteria to penetrate the sinuses. Certain factors may result in the retention of secretions in the paranasal sinuses such as swelling of the mucous membrane leading to a decrease in the patency of the ostia, or reduced transport capacity related to abnormalities of the cilia or overproduction of secretions.

During normal nasal breathing with a patent ostium, 90% of the sinus air is exchanged in five minutes. However with a small ostial size as well as infection, the partial pressure of oxygen in the sinuses is near zero, the partial pressure of carbon dioxide is markedly elevated and there is a decrease in pH. This environment not only encourages bacterial growth and purulence, but also impairs local defenses, such as granulocyte function. (Slavin, 1988.)

According to Brom (1996), in any allergic condition there are two basic dynamics at work. Firstly there are those mechanisms within the system as a whole that maintain health, keep pH of the blood constant, maintain temperature, nourish cells and remove toxins. These are often referred to as anti-pathogenic factors. Other processes work against this natural homeostasis and create disorder, disharmony or disease which are referred to as the pathogenic factors. This results in a daily change in symptoms and signs depending on the relative strengths of the pathogenic and anti-pathogenic factors

The combination of dextrocardia, bronchiectasis and sinusitis has received the appellation Kartagener's syndrome (Hinshaw, 1969). Ocular manifestations of the frontal sinuses may be accompanied by a bulging at the upper and inner angle of the orbit, severe frontal headache and dizziness on stooping. Ethmoiditis may present a tumefaction at the upper and inner part of the orbit with swelling of the integument of the adjacent lids. Disease of the sphenoidal sinuses can lead to optic neuritis. (Allen, 1965.)

2.5 Perpetuating Factors

Patients who have chronic sinusitis should avoid the following as they tend to exacerbate symptoms:

- Smoking
- Smoky atmospheres
- Environment at work and home should have a relative humidity of 60 - 70%
- Long periods in a car with airflow systems on and windows shut (Van Schaick et al. 1997.)

Most disorders attributed to sinusitis are actually the result of pain referred to one or more sinus region such as from the teeth, the temporomandibular joint, trigger points or a subluxation complex, the related rhinorrhea will be clear. Deficiencies in protein, vitamins A, C, E, pantothenic acid and calcium can also exacerbate sinusitis (Schafer, 1996.)

2.6 Neurophysiology

Chiropractors have traditionally treated patients with the goal of restoring and / or enhancing the natural healing process. This is done by removing interference's from the nervous system by correcting subluxations. (Gatterman, 1994.)

It is important to note that within the nervous system there is essentially no localization of effect. Input upon the nervous system at one point may produce physiological affectivity within seemingly unrelated tissues and organs. There is an intimate relationship between the somatic - sensorial bed and the visceral elements. (Janse, 1978.)

Inglis et al (1979) states that patients who had suffered from medically diagnosed organic or visceral disorders were significantly relieved by chiropractic treatment. The chiropractor ensures that the spinal column is functioning normally which may relieve the visceral ailment, or, due to the spinal impediment to the nervous system having been relieved, the patient is better able to cope with the ailment.

Chiropractics seems to influence the homeostasis of the body through normalizing the tone of the automatic nervous system. Subluxations are associated with segmental facilitation and this in turn involves hyperactive sympathetic neuromeres, segmental sympatheticonia and tissue and cell pathophysiology. (Gatterman, 1994.)

2.7 Diagnosis of Chronic Sinusitis

The clinical signs and symptoms of sinusitis are difficult to distinguish from those of other upper respiratory tract infections (Thistlethwaite, 1998).

The diagnosis of chronic sinusitis is made essentially by a very accurate history and a physical examination (Rachelefsky, 1989). It is important to consider that facial pain may be caused by other conditions such as tension headaches, migraines or dental disease (Thistlethwaite, 1998).

Conditions that tend to mimic chronic sinusitis are:

- ° Headache - which can be caused by dental infection, migraine or tension headache, temporal arteritis, temporomandibular joint syndrome, tumor.
- ° Post nasal drip - which can be caused by chronic rhinitis, dyscrinism (abnormal mucosal gland secretions), nasal polyposis
- ° Chronic cough - which can be caused by asthma or gastroesophageal reflux (Godley, 1992.)

A diagnosis of chronic sinusitis should be based on the presence of multiple symptoms and an underlying cause should be considered. Patients may have an anatomical abnormality of the middle meatus. This is the structure through which the frontal, maxillary and ethmoidal sinuses drain into the nasal cavity. If this area is narrowed, congestion can occur. Chronic sinusitis can also be associated with nasal polyps and underlying dental problems. Habitual use of topical decongestants may also cause symptoms. (Thistlethwaite, 1998.)

Diagnostic aids commonly used are cytological examination of nasal secretions, roentgenograph, transillumination and ultrasonography (Rachelefsky, 1989). Swabs for culture, however, are often unhelpful unless the specimen is obtained directly from the sinus due to the presence of commensal organisms. X-rays may show opacification or fluid level in the frontal or maxillary sinuses. (Grant, 1998.)

Diagnosis of more unusual causes of chronic sinusitis are now being considered. Disorders such as immotile cilia syndrome, cystic fibrosis, Young's syndrome and previously unrecognized immunodeficiencies are now being recognized. It is therefore important to do immunological tests, electron microscopy of the nasal mucosa and sweat tests, should these diagnoses be suspected. (Josephson, 1991.)

It is found that most patients suffer from unilateral sinus tenderness rather than bilateral tenderness, as acute infections are unlikely to be bilateral. Pain and congestion can however be perceived as bilateral, but will usually be worse on one side. (Van Schaick et al. 1997.)

The most commonly recognized causative organisms of chronic sinusitis according to Van Schaick et al. (1997) are:

- Streptococcus pneumoniae
- Streptococcus pyogenes
- Haemophilus influenzae
- Branhamella catarrhalis
- Anaerobic bacteria

Plain film radiography is unlikely to yield therapeutically significant information if the abnormality is mucosal thickening of the sinuses (Curl, 1990).

2.8 Examination

Examination of the patient may add little to the clinical suspicion. There may be dripping into the throat when the mouth is examined. (Thistlethwaite, 1998.) Anterior rhinoscopy may reveal nasal polyps or purulent drainage. This does not however, provide an adequate view of the osteomeatal unit. Palpation of the involved sinuses may confirm tenderness, however, this sign is invariably non specific. Transillumination provides little information about the ethmoidal sinuses which play an important role in chronic sinusitis. (Godley, 1992.)

Physical examination can reveal rhinorrhea, a red, boggy, nasal mucosa, erythema, postnasal drip and cobblestoning in the posterior pharynx. The lateral lymphoid tissue may be swollen and nasal drainage may be absent or diffuse. The colour of the nasal drainage may be clear, yellow or green and the consistency may be thin to thick. (Rachelefsky, 1989.)

There are no laboratory tests that are specifically designed for the diagnosis of chronic sinusitis. Erythrocyte sedimentation rate, elevations of white blood cell count or the immunoglobulin E levels are of little diagnostic value. A nasal smear to look for eosinophils or neutrophils may help to differentiate allergic from infectious rhinorrhea.

Fiberoptic examination is found to be extremely useful for a complete examination of the nasal cavity. This allows the doctor to visualize any septal deviations, polyps, the specific source of thick or purulent discharge as well as tumors. It is also possible to determine the size and shape of the infundibulum, nasofrontal duct, ethmoid bulla, maxillary ostium and middle turbinate. (Godley, 1992.)

Computerized tomograph (CT) scanning can provide multiple detailed images of the medial maxillary sinus walls, the sphenoid sinuses and the ethmoid sinuses. CT findings of mucosal thickening within the sinuses and "stenotic" anatomic structures are considered evidence of chronic sinusitis. (Godley, 1992.)

In conclusion, although there are numerous methods of diagnosing certain types or signs attributed to sinusitis, there is nothing that on its own conclusively and without any margin of error diagnoses sinusitis. It was therefore one of the complications encountered while doing this particular research project, there were financial constraints, thus limiting the extent to which specific tests could be carried out, thus, making it difficult to obtain objective data. The best was done with the aid of questionnaires, clinical judgement and relevant physical examination.

2.9 Clinical characteristics of chronic sinusitis

According to Mead (1997) the clinical symptoms of chronic sinusitis are:

- Pain over the site of the sinus - above the eyes if frontal sinuses are affected or below the eyes if maxillary sinuses are affected.
- Disturbance or loss of the sense of smell.
- Nasal blockage and discharge - this may be present or absent. A purulent discharge may drip down the back of the throat as well as down the nose.
- Pyrexia - fever often as a result of infection by gram-negative bacteria.

According to Van Schaick et al. (1997) the clinical signs of chronic sinusitis are:

- Tenderness on palpation
- Tenderness on percussion over sinus or tapping teeth
- Pain made worse on bending
- Sinus cannot be transilluminated

There are other symptoms and signs which can be added to this list, such as:

- Pressure type headache which may vary in location and intensity
- Foul odour or bad breath
- Cervical adenitis
- Blocked ears, ear pressure or otalgia
- Light nose bleeds (Josephson, 1991.)

It was also found that in a controlled study, statistically the most common presenting symptoms of chronic sinusitis were nasal obstruction (94%), postnasal drainage (92%), facial pain or headache (90%), rhinorrhea (61%), and asthma (16%), unfortunately no mention was made pertaining to the number of subjects who partook in this particular study, thus the larger the sample size the greater the accuracy in percentages. (Josephson, 1991.)

2.10 Treatment of chronic sinusitis

In conventional medicine chronic sinusitis is treated with long courses of antibiotics and steroid nasal sprays (Mead, 1997). Patients may also use decongestant drops and steam inhalations at the development of any symptoms (Van Schaick et al. 1997). These therapies are directed at controlling bacterial overgrowth and reducing mucosal inflammation.

Antihistamines and cromolyn sodium are useful for patients with chronic sinusitis as well as a preexisting allergy. (Godley, 1992.) Such management is often prescribed along with the suggestion of avoiding cigarette smoke, swimming, and having a controlled environment (Rachelefsky, 1989). There is however, to the best of my knowledge, no controlled studies based on these methods of treatment protocols and therefore their success rate must be questioned.

Patients who fail at least four weeks continuous conventional therapy are considered candidates for endoscopic sinus surgery. They will have to undergo a complete history, comprehensive systemic nasal endoscopy and CT examination prior to surgery. All the changes identified on CT must be correlated with symptomatology and endoscopic findings. The endoscopic surgery entails the removal of diseased tissue from key areas and preserving the normal functional tissue. (Josephson, 1991.)

Surgery does not normally have a high success rate, although yet again there is no statistical evidence, so many people are looking towards alternative therapies such as acupuncture and chiropractic treatment for chronic sinusitis. There are no case studies or case reports in peer-reviewed literature regarding chiropractic adjustment therapy for the management of patients with allergies or sinusitis. However, several articles have appeared in a chiropractic trade journal. Management of *Candida albicans* allergy, *allergic rhinitis (sinusitis)* associated with C1 - C3 segmental dysfunction, and differentiating neurogenic triggers for the allergic reaction versus atopic IgE-mediated allergy, were reported in the *Digest of Chiropractic Economics*. There is growing evidence that chiropractic adjustments do influence natural killer cell production and immunity. (Leach, 1993.)

Schafer (1996:62-64) suggested that the spinal fixations likely to be found in chronic sinusitis sufferers are C1 - C3 and T1 - T2. Following tissue relaxation and adjustment of the subluxated segments he also claimed that the application of a deep high-velocity percussion spondylotherapy over segments T1 - T2 for four to five minutes enhanced the therapy. However, there appears to be no studies that substantiated these statements.

Van der Walt (1997) found through personal experience of being in practice for more than 25 years that adjustment of C2 for the treatment of chronic sinusitis resulted in approximately 50% of his patients experiencing immediate drainage of the sinuses as well as significant symptomatic relief. He also noticed that most sinusitis sufferers had a poor sleeping posture in that they slept on their stomachs, which could be a contributing factor to their disorder. The patients he treated were usually asymptomatic after two weeks to two months. He also found that patients who were asymptomatic, needed to return once every few months when the symptoms started to return again to help prevent the reoccurrence of the sinusitis. No mention was made of any co-intervention.

Tetrault (1998a) states that the adjustment of the atlas, usually on the left, helped to relieve sinus headaches. In a personal communication with Tetrault (1998b) he stated that these findings were a part of the results of three uncontrolled clinical trials performed in his clinic in 1983 and 1984, and that his subsequent fourteen years of practice have consistently supported these findings. The author stated that these trials were not controlled or double blinded and the sample size was not taken into consideration and therefore of great subjectivity.

Traditional Chinese acupuncture is largely an individualized therapy, which is usually altered during treatment. It does not adapt easily to the method of investigation of western medicine where controlled and blind trials as well as uniformity are necessary. During clinical trials acupuncture is possibly turned into a less specific form of therapy, thus reducing the possible effect. (Hansen et al. 1983.)

O'Connor and Bensky (1981) stated that traditional Chinese medicine attributed chronic sinusitis to "Wind" and "Cold" which affects the lungs and disturbs the natural cleansing function of this organ. They also state that this condition may arise from "Heat" in the lungs or "Fire" in the liver and gall bladder, which then ascends towards the head.

Maciocia (1994) expands a little on what "Wind-Heat", "Lung-Heat" and "Liver and Gall-Bladder Fire" are viewed clinically. "Wind-Heat" is characterised with a stuffy nose, purulent nasal discharge, decreased sense of smell and fever. "Lung-Heat" is characterised by tenderness over the maxillary sinuses, flushed face, feeling of heat, purulent nasal discharge, headache and thirst. "Liver and Gall-Bladder Fire" is characterised by bloodshot eyes, headache on temples and cheeks, bitter taste, dizziness, irritability and purulent nasal discharge.

O'Connor and Bensky (1981) advocate a treatment that is directed towards clearing the lungs and nasal cavities. The principle points used by them are Large Intestine 20 (one of the points used in this study), Bladder 2 and Bladder 7. These points however, have not been researched in a controlled study.

Generally speaking acupuncture can be classified into three main aspects of functioning, namely, analgesic, regulatory and immunological (Mao-Liang *et al.* 1993). As sinusitis is a stubborn, chronic disease which usually requires long-term treatment it is important to attend to any underlying deficiency as well as clearing Heat, resolving Damp-Heat or Fire-Poison. It has been noted that the most likely deficiencies are those of Lung-Qi, and Stomach and Spleen Qi. (Maciocia, 1996.)

Brom (1996) states in a review of clinical trials pertaining to acupuncture and allergies, that acupuncture appears to have both an analgesic and regulatory affect. It has been shown to raise the defense capability of the organism and increase the effectiveness of its immunity. It also has a sedative and psychological effect, which goes beyond any placebo effect. Acupuncture has been found to be very successful in treating hay fever and sinusitis. Usually four to ten treatments are required but some patients are totally free of symptoms after one treatment. Seventy percent of patients will respond positively to acupuncture with about 30-35% remaining free of symptoms for longer than six months. Some return after a few years for further booster treatment. It must be noted that this was not a controlled study done by Brom.

Liggins (1997), based on anecdotal evidence, suggests that the use of Gallbladder 14, Stomach 2, Large Intestine 19 and 20 (again Large Intestine 20 was used in this particular study), Extra Point 1, and if a headache is present, Large Intestine 4, all can be used to relieve chronic sinusitis very effectively. In his experience the patient often has immediate drainage of the sinuses post nasally, which continues once the needles have been removed.

Schafer (1996:62-64) suggests that adjunctive therapy to spinal adjustment for the treatment of chronic sinusitis is the use of acupuncture points Stomach 2, Stomach 40, Large Intestine 20, Lung 7, Gall Bladder 14, Conception Vessel 24 as well as auriculopoints 13, 16, 31, 33. The above mentioned acupuncture points were utilized in this research project.

Pothman (1982) did a clinical study where he compared three different types of therapy for chronic sinusitis. Forty-five patients between the ages of three and forty years, were treated. Nineteen patients were given antibiotics, eighteen patients had acupuncture and eight had laser-therapy and antibiotics. The patients treated by antibiotics did not show significant improvement, however, the patients treated with acupuncture did, as well as a longer period of being symptom free. Though not statistically significant, he concluded that children should be treated with antibiotics due to the danger of osteomyelitis and meningitis. Acupuncture should be tried prior to any major invasive procedure is carried out.

2.11 Summary

There do not appear to be any controlled studies comparing the relative effectiveness of acupuncture versus chiropractic treatment for chronic sinusitis.

The aim of this dissertation will be to determine which therapy is more effective in the treatment of chronic sinusitis, not only as a primary therapy, but also as an adjunctive therapy for this common and distressing condition.

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1 Introduction

This study was designed as a comparative, clinical trial. The objective was to compare two treatment groups (chiropractic treatment versus acupuncture treatment) to assess for intra-group improvement. On conclusion of the treatment protocols, an inter-group statistical analysis was performed to determine whether one treatment protocol was more effective than the other. The more effective treatment group could then be used as either the primary treatment for chronic sinusitis or it could be used as an adjunct to other sinusitis treatment options.

3.2 The allocation of subjects

Patients were obtained by means of consecutive sampling, using advertisements posted around Technikon campus and local newspapers. No restrictions were placed on a patients age, race, sex, income bracket or area of residence.

Any patient presenting to the clinic with chronic sinusitis of more than six months duration was considered a potential candidate for the study. These patients were then briefly screened and further investigations took place only if the researcher deemed the patient suitable for the study. The screening procedure involved questioning the patient on the symptoms they were experiencing, palpation of the sinuses for swelling, examination of the nasal mucosa for swelling and changes in the colour of the mucosal discharge.

3.3 Inclusion and Exclusion criteria of patients

1. Patients had to be fifteen (15) years or older.
2. Only patients diagnosed by a medical practitioner or the researcher as having chronic sinusitis were considered.
3. Any patient suffering from a local or systemic pathology would not be eligible for the study eg. asthma, trigger points, upper respiratory tract infections etc.
4. Patients were not allowed to take any medication for the treatment of sinusitis. If they were, they had to cease to do so forty eight (48) hours prior to their first treatment. Patients who were on antibiotic medication had to have completed their course of antibiotics one (1) month prior to treatment.
5. The patients condition had to comply with at least three (3) of the following inclusion criteria for the diagnosis of chronic sinusitis (Mead, 1997):
 - Pain over the affected sinus
 - Tenderness over the affected sinus
 - Disturbance or loss of the sense of smell
 - Nasal blockage and discharge
 - Pyrexia
6. Any patient for whom spinal adjustment was contraindicated as described by Triano et al. (1992:352) was excluded from this study:
 - Osteomyelitis
 - Tuberculosis of the spine

- Infectious arthritis
- Haemangioma
- Vertebral malignancy
- Spondylolisthesis

7. Likewise the following list, as described by Liggins (1995), was used to exclude any patient for whom acupuncture was contra indicated:

- Pregnancy - particularly in the first trimester
- Local malignancies
- Skin infections
- Severe emotional stress
- Frail constitutions
- Cachexia
- Severe chronic cardiac failure
- People under the influence of alcohol

Patients had to comply with all of the inclusion criteria in order to be accepted into the research program.

3.4 The sample group

A sample of thirty (30) patients were randomly divided into two groups of fifteen (15) according to the process of randomization as described by Scott-Dawkins (1995). Fifteen (15) labels were inscribed with the letter 'C' representing the treatment group in which chiropractic treatment was utilized. Likewise, fifteen (15) labels were inscribed with the letter 'A' representing the treatment group in which acupuncture treatment

was utilized. The thirty (30) slips of paper were then folded such that the letters were obscured and were then put into a hat.

After the hat had been sufficiently agitated, the labels were drawn one at a time. The sequence of letters drawn was then recorded next to a list numbering one (1) to thirty (30) (Addendum A). In such a fashion the point in the list at which a patient joined the study would allocate the specific treatment for that patient. There was no patient blinding involved in this study as each patient was informed of the two treatments and to which group they had been allocated.

The treatment schedule used was conducted over two (2) months with a one month follow-up. Patients who passed the initial screening test and inclusion criteria underwent a detailed case history (Addendum B), relevant physical examination (Addendum C) and cervical spine regional examination (Addendum D), if, after this consultation the patient was still deemed acceptable, a series of eight (8) treatments within a two (2) month period were scheduled. A follow-up appointment was then scheduled for one (1) month after the eighth treatment.

3.5 Interventions

Group A received spinal adjustments as their treatment, while group B received acupuncture treatment. The patients in group A were motion palpated and the indicated level of adjustment according to Schafer (1996:62-62) and van der Walt (personal communication, 1997) was selected from either C1, C2, C3 or T1, T2. These vertebrae were selected according to the presence of a joint dysfunction. Indications of a dysfunctional vertebral segment include hard end feel, joint fixation and soft tissue alteration (Schafer and Faye, 1990:27).

The involved area was adjusted according to the relevant diversified technique. One of the following adjustment techniques, as described in Szaraz (1990), was applied to the dysfunctional level/s of the cervical or thoracic spine:

- Supine lateral break (p57)
- Rotary (p52)
- Thumb extension (p48)
- Side posture - toggle recoil (p51)
- Sitting cervical - rotary (p61)
- Sitting cervical - lateral flexion (p63)
- Thumb move (p77)
- Combination (p79)
- Crossed bilateral (p108)

The patients in group B received acupuncture treatment with the use of all of the following acupuncture points (see addendum E):

- Stomach 2 (St)
- Stomach 40
- Large Intestine 20 (Li)
- Large Intestine 4
- Lung 7 (L)
- Gall Bladder 14 (GB)
- Conception Vessel 24 (CV)
- Auriculo Points 13, 16, 31 and 33 (Schafer, 1996: 62-64)

3.6 Measurements

3.6.1 Subjective Measures

At the initial consultation as previously stated, the case history, relevant physical examination and cervical spine regional examination were completed.

At the first consultation each patient was required to fill out a patient consent form (Addendum F) making them eligible for entry into the study. In addition this ensured that each patient was given a full description of the study and their role therein. The patient was obliged to fill in the sinusitis rating scale (Addendum G), and the researcher completed a questionnaire (Addendum H) which were both based on a design by Sengpiehl, (1994). These forms subjectively and objectively assessed the various aspects of the patients discomfort.

At consultations two (2) to seven (7), no subjective or objective measurements were performed on the patient. At treatment eight (8) and at the one month follow-up, the subjective and objective measurements were repeated so that any improvement during the treatment and the duration of that improvement could be assessed. The sinusitis rating scale was pre-tested on five (5) lay people who assessed whether the questionnaire was ambiguous or leading in any way, and was completed by both groups A and B under the supervision of the researcher. This pilot study conducted on the questionnaire showed that the questions were clearly understood, thus proving that the questionnaire was both reliable and valid for utilization in this particular study.

The first question consists of a diagram of a persons face on which the patient was required to indicate the location of the facial pain using three (3) adjectives. The second question provides six (6) adjectives to choose from pertaining to the type of facial pain experienced by the patient.

The third question provides five (5) adjectives to choose from pertaining to the severity of the facial pain experienced by the patient. A score of zero (0) to four (4) was given for each adjective depending on whether the discomfort was ranked "none", "mild", "moderate" or "excruciating" respectively. The option "none" carried a nil (0) score while "excruciating" carried a score of four (4). The type of headache indicated as "burning" carried a nil (0) score, "stabbing" carried a score of one (1), "aching" carried a score of two (2), "throbbing" carried a score of three (3), "dull" carried a score of four (4), "tight" pressure carried a score of five (5).

The fourth (4) question was based on the Numerical Pain Rating Scale - 101 (NPRS -101) due to the ease with which it can be administered and scored. The patient was asked to mark off a point on a ten (10) centimeter line, between zero (0) and one hundred (100), when the post nasal drip was running at its most sever. Likewise this was repeated on a second identical line when the post nasal drip was running the least with zero (0) indicating no post nasal drip and one hundred (100) indicating the most severe post nasal drip. The same was done to rate the severity of cough experienced by the patient.

The scores were calculated by measuring the distance from zero (0) to the patients mark. The values from the worst post nasal drip and the least post nasal drip were added together, divided by two (2) and finally expressed as a percentage of one hundred (100). The same procedure was performed for the cough experienced by the patient.

3.6.2 Objective Measurements

An objective assessment of changes in the patients condition during treatment and after one month was required for this study. To this end a questionnaire was used, designed by the researcher to provide information pertaining to the level of physical changes experienced by the patient.

The first question had four (4) adjectives to choose from with reference to the mucosal swelling present which was assessed with the aid of a nasal speculum. The second question had four (4) adjectives to choose from with reference to facial swelling present and this was assessed by palpation over the sinuses. The third question had four (4) adjectives to chose from with reference to the colour of the nasal mucosa.

A score of zero (0) to three (3) was given for each adjective depending on whether the swelling was 'none', 'mild', 'moderate' or 'severe' respectively. The option 'none' carried a nil (0) score, while sever carried a score of three (3).

The third question however was scored as follows:

- pale = 0
- yellow = 1
- green = 2
- red = 3

3.7 Statistical Procedure

The sample size was small (30) therefore non-parametric tests were used to do the analysis. Parametric tests such as the 2 - sample unpaired t - test could not be used as the sample size per group was too small.

3.7.1 Procedure 1: Wilcoxon Sign Rank Test

The Wilcoxon Sign Rank test was used to find out whether there was any statistically significant change **within** group one and **within** group two before treatment one, between treatment one and eight, between treatment eight and the follow-up appointment and finally between treatment one and the follow-up appointment ie.

treatment one	vs	treatment eight
treatment eight	vs	follow-up
treatment one	vs	follow-up

Treatment one vs treatment eight shows if the treatment had any affect on the symptomatology experienced by the patient suffering from chronic sinusitis. Treatment eight vs the follow-up appointment shows how long the affect of the treatment could last. Treatment one vs the follow-up appointment shows the difference in symptomatology before treatment and at the end of the treatment programme.

Hypothesis testing and the decision rule:

The null hypothesis (H^0) stated that there was no significant improvement during treatment one, between treatment one and eight, between treatment eight and the follow-up appointment and finally between treatment one and the follow-up appointment. The alternative hypothesis (H_1) stated that there would be a significant difference between the treatment intervals stated above.

H^0 : there was no significant difference

H_1 : there was a significant difference

$\alpha = 0.05$ = the level of significance

For a two - tailed test,

reject H^0 if $P < \alpha / 2 = 0.025$

accept H^0 if $P > \alpha / 2 = 0.025$

P was the observed significant level

3.7.2 Procedure 2: Mann-Whitney Unpaired Test

This test was used to make comparisons **between** the two experimental groups. The two groups were treated as being independent of one another. The purpose was to find out whether there was a significant difference between the two groups at the $\alpha / 2 = 0.025$ level of significance with respect to the sinusitis rating scale and the objective questionnaire. Mann-Whitney Unpaired Tests were used to compare groups one and two.

Hypothesis testing and the decision rule:

The null hypothesis (H^0) stated that there was no significant difference between the two groups with respect to the variable of interest. The alternative hypothesis ($H1$) stated that there was a significant difference between the two groups.

$$H^0 : \mu_1 = \mu_2$$

$H1 : \mu_1$ and μ_2 were significantly different from each other

$\alpha = 0.05$ = the level of significance

for a two - tailed test,

reject H^0 if $P \leq \alpha / 2 = 0.025$

accept H^0 if $P \geq \alpha / 2 = 0.025$

Note : P was the observed significance level

3.7.3 Procedure 3 : Summary Statistics

Summary statistics including the mean, standard deviation and standard error were obtained to support the results from the Wilcoxon's Signed Rank Test and the Mann-Whitney U Test.

If the two statistical tests calculated any significant difference between the two groups, then the mean was used to identify the superior group. The reliability of the mean was then measured using the standard deviation which measures the spread of the data around the mean. The larger the value, the larger the spread of the values and hence the less reliable the data. The standard error was used to measure the reliability of the mean used in the statistical tests.

As the Mann-Whitney U Test and the Wilcoxon Signed Rank Test used the median within the calculations, the mean used to complement the results, increasing the reliability of the statistical analysis.

3.7.4 Procedure 4 : Diagrammatic Representation of the Data

Bar charts and tables were constructed to present the major findings of the study as a visual summary. These bar charts and tables were able to give a summary of the results obtained from the Mann-Whitney and Wilcoxon Signed Ranked Tests.

Power analysis results of each test were given below the relevant table. These were then used in the discussion to determine the power of each test and the chance of Type II error.

The bar charts will be made using the software package Microsoft EXCEL 97 SR-1 supplied by MICROSOFT CORPORATION. The tables will be constructed using Microsoft Word 97 SR-1 Version 6.0 also supplied by MICROSOFT CORPORATION. Furthermore the demographic data obtained from the patient's files will be displayed using bar charts and tables, again using Microsoft EXCEL 97 SR-1.

The statistical package STATGRAPHICS PLUS VERSION 6+, supplied by MANUGISTICS INC. (2115 East Jefferson Street, Rockville, Maryland, 20852, USA) was used for data entry and analysis.

CHAPTER 4

RESULTS

4.1 INTRODUCTION

This chapter will present the results obtained from the clinical trial. The first set of data represents the Demographic data obtained from the patient's files.

The second set of data represents the statistical analysis of the results. As the sample group size was thirty patients, non-parametric hypothesis testing was used. The results from the statistical analysis are tabulated to display the mean, the standard deviation, the standard error and the probability value. The P-value is compared to the level of significance, which is set at $\alpha = 0.025$, for all the tests.

The subjective findings to be analyzed included the site of facial pain experienced, the type of facial pain experienced, the severity of facial pain experienced, the post nasal drip experienced and the severity of the patients cough.

The objective findings to be statistically analyzed included the mucosal swelling present, the facial swelling present and the colour of the nasal mucosa.

4.2 ABBREVIATIONS

S.D.	-	Standard Deviation
S.E.	-	Standard Error
P Value	-	The observed significance of the test

4.3 DEMOGRAPHIC DATA

Figure 1: The ratio of males to females within the sample was 13:17.

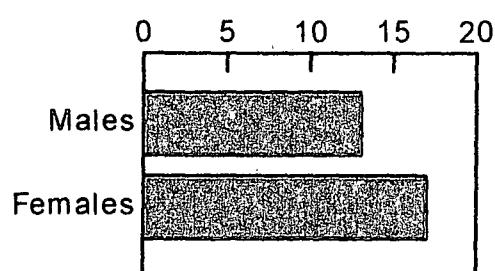


Table 1: The age distribution and gender distribution within the sample group

	Group 1 (Acupuncture)	Group 2 (Chiropractic)	Total
<u>Age Distribution</u>			
Age Range:	17 - 52	15 - 48	15 - 52
Average Age:	34,86	27,4	31,13
<u>Gender Distribution</u>			
Female:	9	8	17
Male:	6	7	13

Figure 2: The Severity of the Headaches indicated in the graph below were rated - No Discomfort - 0; Slight Discomfort - 1; Moderate Discomfort -2; Severe Discomfort - 3; Excruciating - 4.

Severity of Headaches

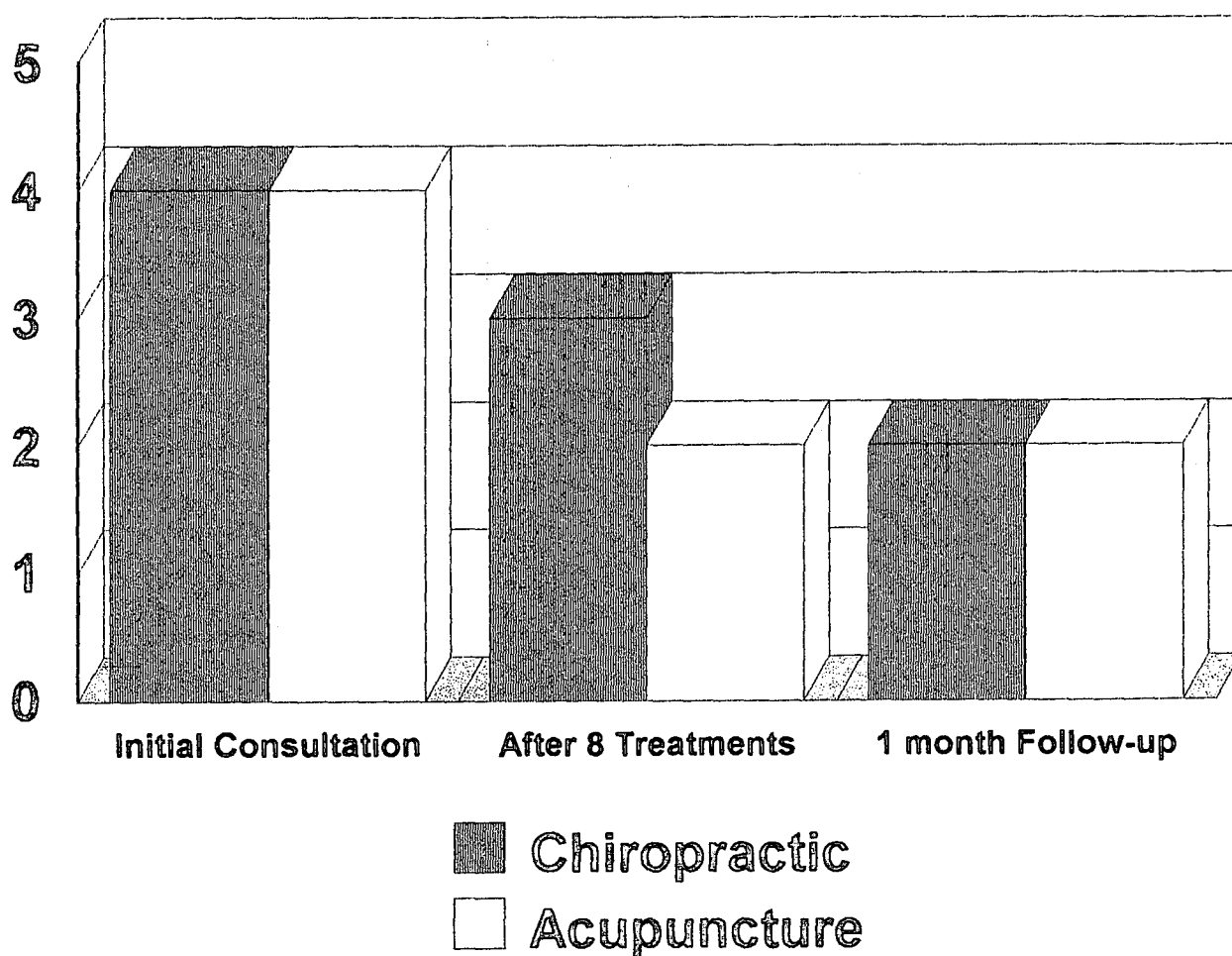


Figure 3: The Percentage of Post Nasal Drip present is indicated in the graph below

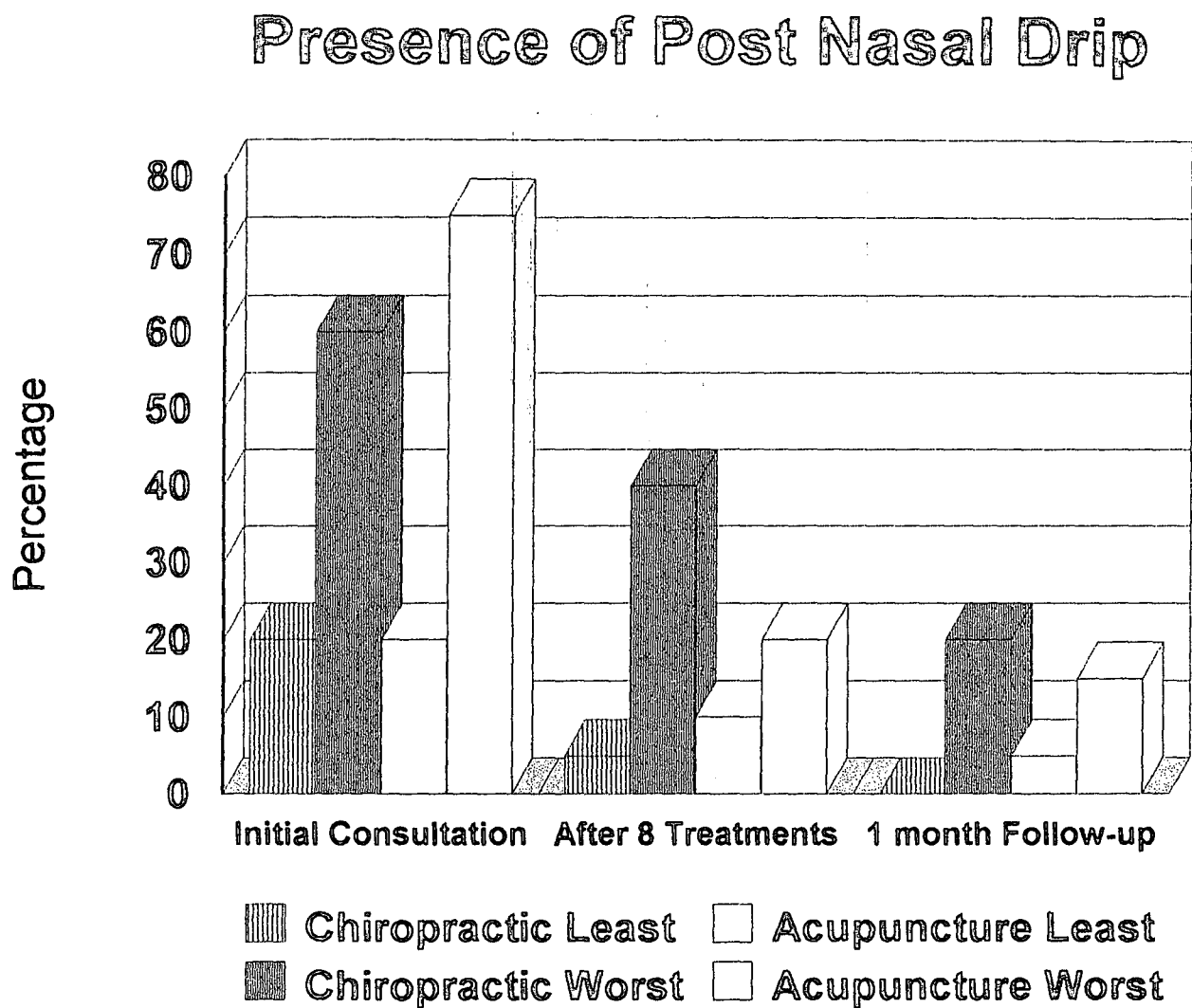


Figure 4: Percentage of Cough experienced is represented on the graph below:

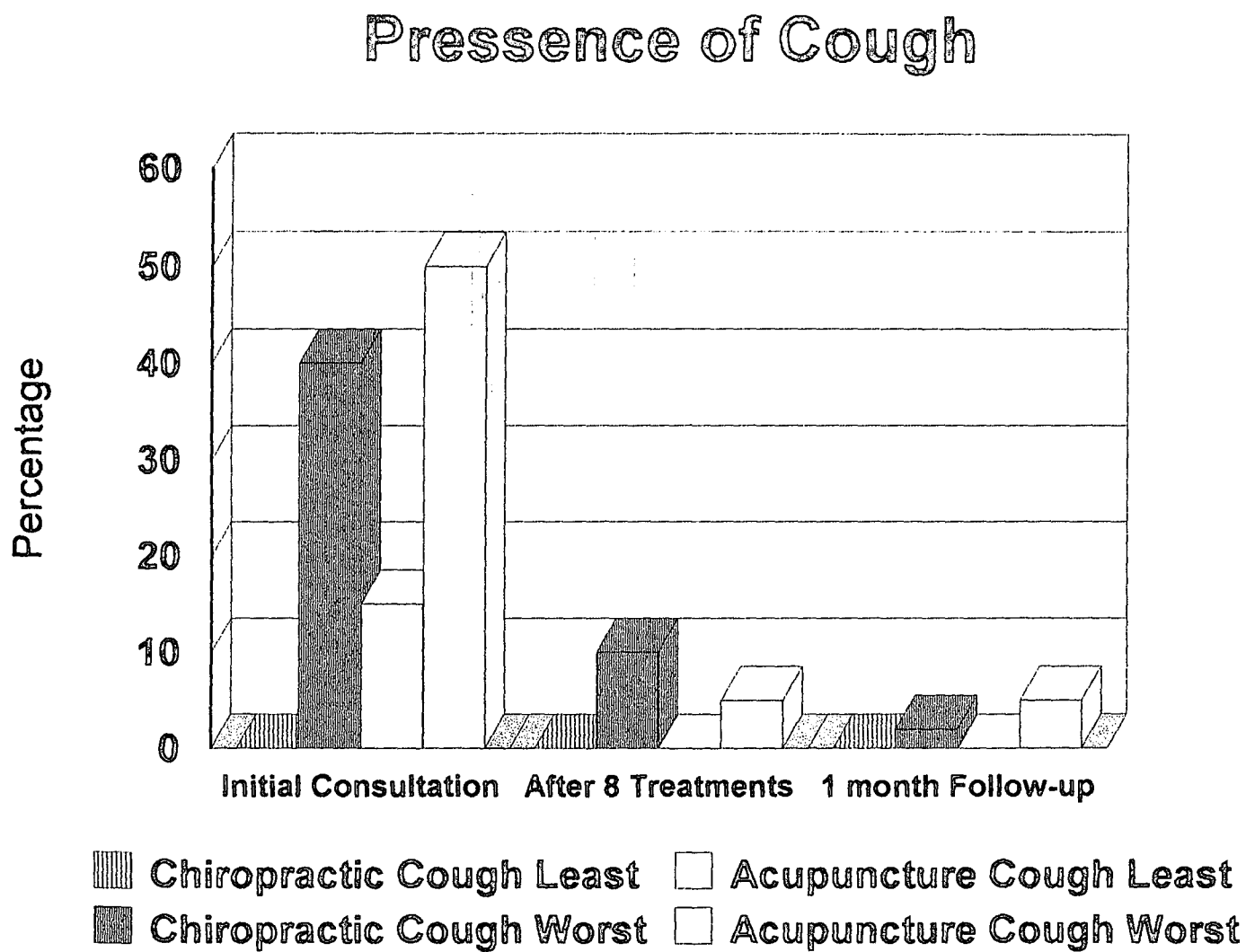


Figure 5: the mucosal swelling was rated as follows: None - 0; Mild - 1; Moderate - 2; Severe 3.

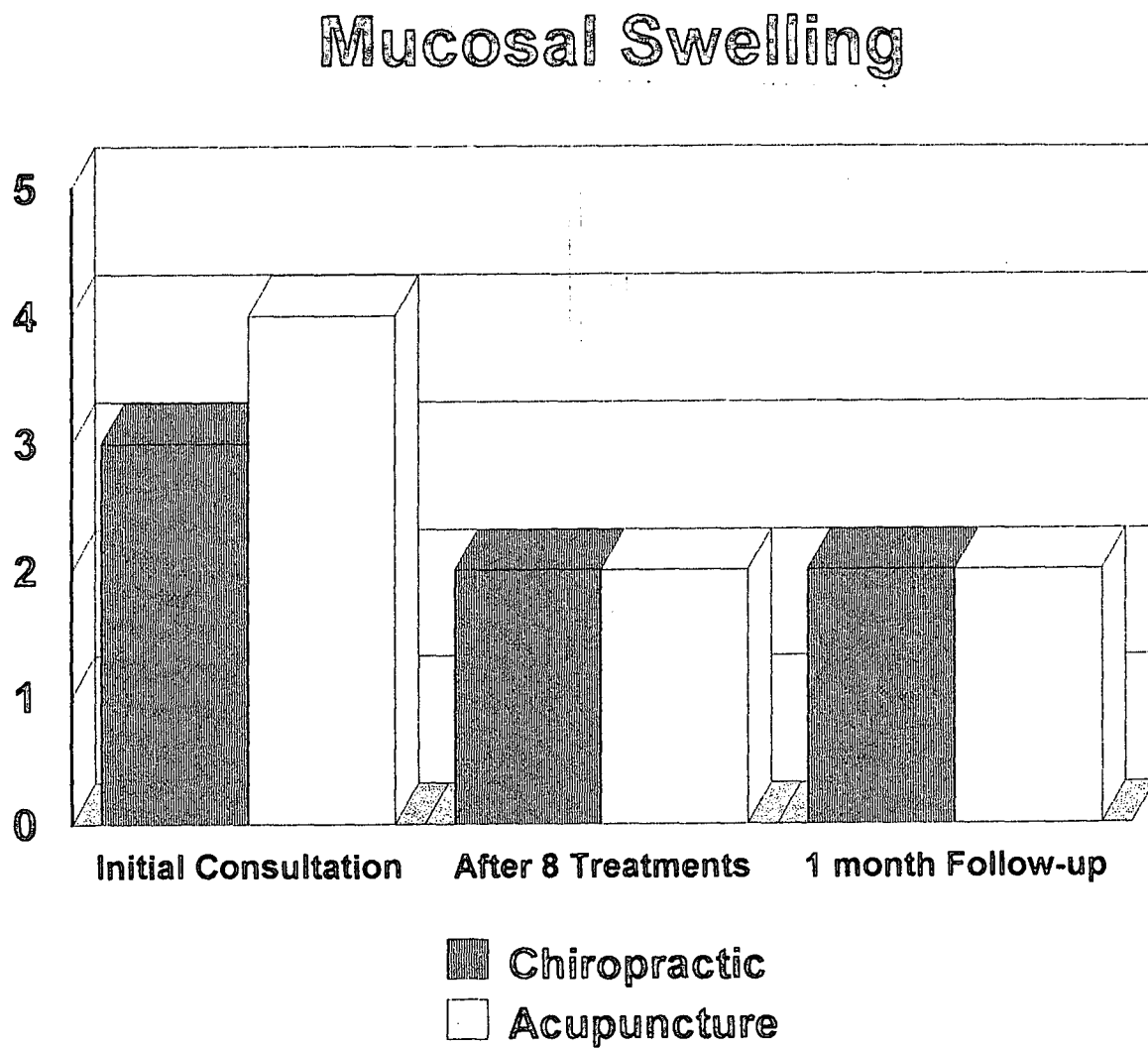


Figure 6: Facial Swelling was rated as None - 0; Mild - 1; Moderate - 2; Severe - 3

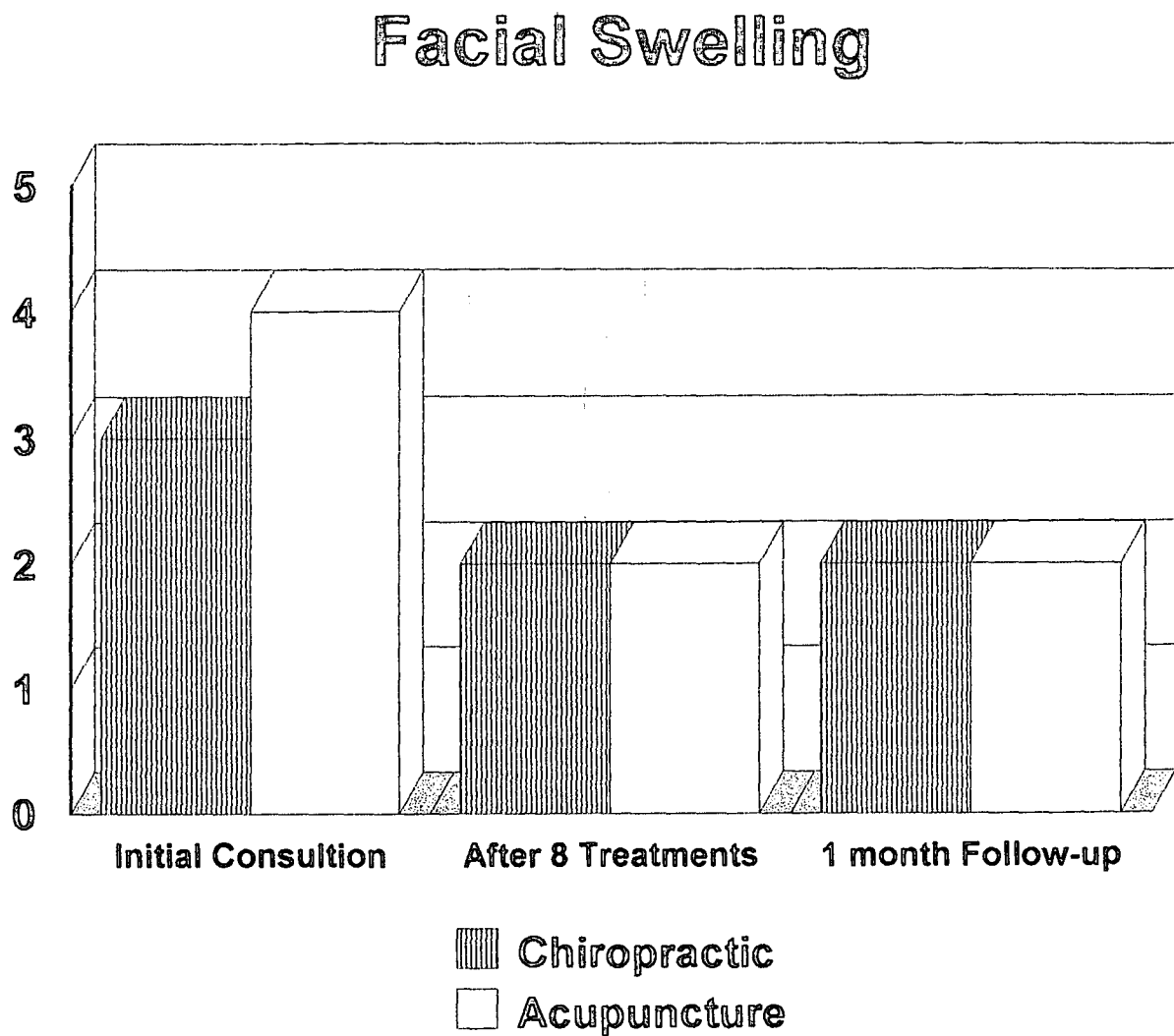


Figure 7: Changes in Nasal Mucosal Colour represented by - Pale 0, Yellow - 1; Green - 2; Red -3

Nasal Mucosal Colour

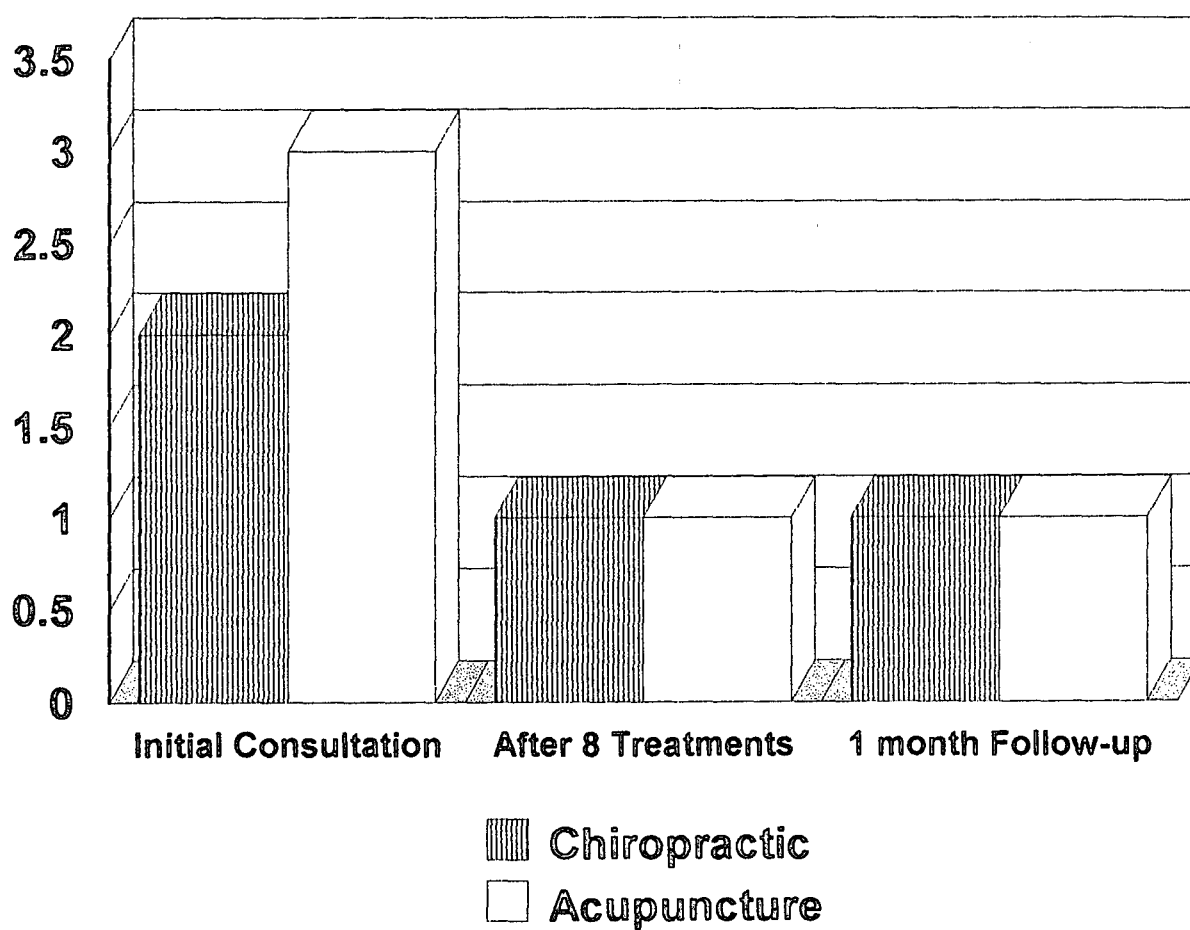


Table 2: The results of Wilcoxon's signed-rank test comparing the statistical results of all objective findings between the initial consultation and eighth treatment for Group 1

	Group 1 : Chiropractic Treatment						
	Initial Consultation			P - Value	Eighth Treatment		
	Mean	Standard Deviation	Standard Error		Mean	Standard Deviation	Standard Error
Nasal Mucosal Colour	1.8666	0.7432	0.1918	0.0770	1.3330	0.6172	0.1593
Facial Swelling	3.1333	0.5163	0.1333	0.0076	2.2666	0.8837	0.2281
Mucosal Swelling	3.1333	0.5163	0.1333	0.0044	2.2000	0.8618	0.2225
Power							
Nasal Mucosal Colour				0.360			
Facial Swelling				0.220			
Mucosal Swelling				0.819			

For changes in the nasal mucosal colour, the null hypothesis is accepted and one can conclude at the 95% confidence level, there was no significant objective improvement between the initial and eighth treatments.

For facial swelling and mucosal swelling, the null hypothesis is rejected which indicates that at 95% confidence level one can conclude that there was significant objective improvement between the initial and eighth treatments.

In all instances above in both treatments, the standard deviation values, showing the spread of the data around the mean, were similar enough to render the two sets of data reliable and comparable.

Table 3 - The results of Wilcoxon's signed-rank test comparing the statistical results of all findings between the initial consultation and one month follow-up for Group 1

	Group 1 : Chiropractic Treatment						
	Initial Consultation			P - Value	One month follow-up		
	Mean	Standard Deviation	Standard Error		Mean	Standard Deviation	Standard Error
Nasal Mucosal Colour	1.8666	0.7432	0.1918	0.0044	1.0000	0.0000	0.0000
Facial Swelling	3.1333	0.5163	0.1333	0.0008	1.8666	0.7432	0.1918
Mucosal Swelling	3.1333	0.5163	0.1333	0.0080	1.8000	0.7745	0.2000
Power							
Nasal Mucosal Colour				0.997			
Facial Swelling				0.954			
Mucosal Swelling				0.979			

For changes in the nasal mucosal colour, facial swelling and mucosal swelling the null hypothesis is rejected which indicates at the 95% confidence level, one can conclude that there was significant objective improvement between the initial and one month follow-up treatments

In all instances above in both treatments, the standard deviation values, showing the spread of data around the mean, were similar enough to render the two sets of data reliable and comparable.

Table 4 - The results of Wilcoxon's signed-rank test comparing the statistical results of all findings between the eighth consultation and one month follow-up for Group 1

	Group 1 : Chiropractic Treatment						
	Eighth Consultation			P - Value	One month follow-up		
	Mean	Standard Deviation	Standard Error		Mean	Standard Deviation	Standard Error
Nasal Mucosal Colour	1.3333	0.6172	0.1593	0.1336	1.0000	0.0000	0.0000
Facial Swelling	2.2666	0.8837	0.2281	0.0455	1.8666	0.7432	0.1918
Mucosal Swelling	2.2000	0.8618	0.2225	0.0455	1.8000	0.7745	0.2000
Power							
Nasal Mucosal Colour				0.0740			
Facial Swelling				0.3450			
Mucosal Swelling				0.3450			

For changes in the nasal mucosal colour, facial swelling, mucosal swelling, the null hypothesis is accepted and one can conclude at the 95% confidence level, there was no significant objective improvement between the eighth and the one month follow-up treatments. Thus, it appears that although chiropractic treatment helps to reduce the symptomatology, the lasting effect is questionable.

In all instances above in both treatments, the standard deviation values, showing the spread of data around the mean, were similar enough to render the two sets of data reliable and comparable.

Table 5: The Wilcoxon's signed-rank test comparing the statistical results of all findings between the initial consultation and the eighth treatment for Group 2

	Group 1 : Acupuncture Treatment						
	Initial Consultation			P - Value	Eighth Treatment		
	Mean	Standard Deviation	Standard Error		Mean	Standard Deviation	Standard Error
Nasal Mucosal Colour	2.6660	0.7237	0.1868	0.0005	1.1333	0.3518	0.0908
Facial Swelling	3.6000	0.5070	0.1309	0.0014	1.8000	0.9411	0.2429
Mucosal Swelling	3.6000	0.5070	0.1309	0.0008	1.8000	0.9411	0.2429
Power							
Nasal Mucosal Colour				0.967			
Facial Swelling				0.997			
Mucosal Swelling				0.989			

For changes in the nasal mucosal colour, facial swelling and mucosal swelling the null hypothesis is rejected which indicates at the 95% confidence level, one can conclude that there was significant objective improvement between the initial and eighth treatments.

In all instances above in both treatments, the standard deviation values, showing the spread of data around the mean, were similar enough to render the two sets of data reliable and comparable.

Table 6 - The results of Wilcoxon's signed-rank test comparing the statistical results of all findings between the initial consultation and one month follow-up for Group 2

	Group 1 : Acupuncture Treatment						
	Initial Consultation			P - Value	One month Follow-up		
	Mean	Standard Deviation	Standard Error		Mean	Standard Deviation	Standard Error
Nasal Mucosal Colour	2.6666	0.7237	0.1868	0.0005	1.0666	0.2581	0.0666
Facial Swelling	3.6000	0.5070	0.1309	0.0008	1.8000	0.9411	0.2429
Mucosal Swelling	3.6000	0.5070	0.1309	0.0008	1.9333	0.8837	0.2281
Power							
Nasal Mucosal Colour				0.979			
Facial Swelling				0.954			
Mucosal Swelling				0.995			

For changes in the nasal mucosal colour, facial swelling and mucosal swelling the null hypothesis is rejected which indicates at the 95% confidence level, one can conclude that there was significant objective improvement between the eighth treatment and one month follow-up.

In all instances in both treatments, the standard deviation values, showing the spread of data around the mean, were similar enough to render the two sets of data reliable and comparable.

Table 7 - The results of Wilcoxon's signed-rank test comparing the statistical results of all findings between the eighth and one month follow-up for Group 2

	Group 1 : Acupuncture Treatment						
	Eighth Treatment				One month Follow-up		
	Mean	Standard Deviation	Standard Error	P - Value	Mean	Standard Deviation	Standard Error
Nasal Mucosal Colour	1.1333	0.3518	0.0908	1.0000	1.0666	0.2581	0.0666
Facial Swelling	1.8000	0.9411	0.2429	0.7236	1.8000	0.9411	0.2429
Mucosal Swelling	1.8000	0.9411	0.2429	0.7235	1.9333	0.8837	0.2281
Power							
Nasal Mucosal Colour				0.074			
Facial Swelling				0.345			
Mucosal Swelling				0.345			

For changes in the nasal mucosal colour, facial swelling, mucosal swelling, the null hypothesis is accepted and one can conclude at the 95% confidence level, there was no significant objective improvement between the eighth and the one month follow-up treatments. Thus, it appears that although chiropractic treatment helps to reduce the symptoms of chronic sinusitis, the lasting effect seems to be questionable.

In all instances above in both treatments, the standard deviation values, showing the spread of data around the mean, were similar enough to render the two sets of data reliable and comparable.

Table 8 - The results of Wilcoxon's signed-rank test comparing the statistical results of all subjective findings between the initial consultation and eighth treatment for Group 1

	Group 1 : Chiropractic Treatment						
	Initial Consultation			P - Value	Eighth Treatment		
	Mean	Standard Deviation	Standard Error		Mean	Standard Deviation	Standard Error
Cough Least	12.6660	19.0737	4.9248	0.7700	2.3333	5.6273	1.6592
Cough Worst	36.3330	31.6491	8.1717	0.0093	14.6666	18.0739	4.6666
Post Nasal Drip Least	21.3330	16.4171	4.2388	0.1610	11.6666	16.2200	4.1880
Post Nasal Drip Worst	59.7333	24.0900	6.2201	0.0019	53.3330	27.2200	7.0282
Severity of Headache	3.8666	0.7432	0.1918	0.0003	2.2666	1.0327	0.2666
Type of Headache	4.1333	0.5163	0.1333	0.0076	2.5333	1.3557	0.3500
Headache Position	3.0000	0.5345	0.1380	0.0412	2.2660	1.0327	0.2666
Power							
Cough Least				0.068			
Cough Worst				0.979			
Post Nasal Drip Least				0.395			
Post Nasal Drip Worst				0.979			
Severity of Headache				0.989			
Type of Headache				0.216			
Headache Position				0.249			

For cough at its least and headache position the null hypothesis is accepted and one can conclude that at 95% confidence level, there was no significant subjective improvement between the initial consultation and eighth treatment.

For cough at its worst, post nasal drip at its least and worst, severity of headache and type of headache the null hypothesis is rejected and one can conclude that at 95% confidence level, there was significant subjective improvement between the initial consultation and eighth treatment.

In all instances above in both treatments, the standard deviation values, showing the spread of data around the mean, were similar enough to render the two sets of data reliable and comparable.

Table 9 - The results of Wilcoxon's signed-rank test comparing the statistical results of all findings between the initial consultation and the one month follow-up treatment for Group 1

	Group 1 : Chiropractic Treatment						
	Initial Consultation			P - Value	One Month Follow-up		
	Mean	Standard Deviation	Standard Error		Mean	Standard Deviation	Standard Error
Cough Least	12.6660	19.0737	4.9248	0.1824	3.3333	5.8756	1.5170
Cough Worst	36.3330	31.6491	8.1717	0.0960	13.9333	19.6776	5.0807
Post Nasal Drip Least	21.3330	16.4171	4.2388	0.0265	8.6666	13.4252	3.4663
Post Nasal Drip Worst	59.7333	24.0900	6.2201	0.0098	27.6660	24.3388	6.2842
Severity of Headache	3.8666	0.7432	0.1918	0.0008	2.0666	1.1629	0.3002
Type of Headache	4.1333	0.5163	0.1333	0.0133	2.6666	1.4960	0.3862
Headache Position	3.0000	0.5345	0.1380	0.1305	2.3333	1.0465	0.2702
Power							
Cough Least				0.068			
Cough Worst				0.979			
Post Nasal Drip Least				0.395			
Post Nasal Drip Worst				0.979			
Severity of Headache				0.989			
Type of Headache				0.216			
Headache Position				0.249			

For cough at its least and worst, the post nasal drip at its least and the headache position the null hypothesis is accepted and one can conclude that at 95% confidence level, there was no significant subjective improvement between the initial consultation and one month follow-up treatment.

For post nasal drip at its worst, severity of headache and type of headache the null hypothesis is rejected and one can conclude that at 95% confidence level, there was significant subjective improvement between the initial consultation and one month follow-up appointment.

In all instances above in both treatments, the standard deviation values, showing the spread of data around the mean, were similar enough to render the two sets of data reliable and comparable.

Table 10 - The results of Wilcoxon's signed-rank test comparing the statistical results of all findings between the eighth treatment and the one month follow-up treatment for Group 1

	Group 1 : Chiropractic Treatment						
	Eighth Treatment			P - Value	One Month Follow-up		
	Mean	Standard Deviation	Standard Error		Mean	Standard Deviation	Standard Error
Cough Least	2.3333	5.6273	1.6592	1.0000	3.3333	5.8756	1.5170
Cough Worst	14.6666	18.0739	4.6666	1.0000	13.9333	19.6776	5.0807
Post Nasal Drip Least	11.6666	16.2200	4.1880	0.4496	8.6666	13.4252	3.4663
Post Nasal Drip Worst	53.3330	27.2200	7.0282	0.3478	27.6660	24.3388	6.2842
Severity of Headache	2.2666	1.0327	0.2666	0.0549	2.0666	1.1629	0.3002
Type of Headache	2.5333	1.3557	0.3500	0.6830	2.6666	1.4960	0.3862
Headache Position	2.2660	1.0327	0.2666	1.0000	2.3333	1.0465	0.2702
Power							
Cough Least				0.089			
Cough Worst				0.089			
Post Nasal Drip Least				0.322			
Post Nasal Drip Worst				0.065			
Severity of Headache				0.426			
Type of Headache				0.050			
Headache Position				0.051			

For cough at its least and worst, the post nasal drip at its least and worst, severity of the headache, type of headache and the headache position the null hypothesis is accepted and one can conclude that at 95% confidence level, there was no significant subjective improvement between the initial consultation and one month follow-up treatment.

In all instances above in both treatments, the standard deviation values, showing the spread of data around the mean, were similar enough to render the two sets of data reliable and comparable.

Table 11 - The results of Wilcoxon's signed-rank test comparing the statistical results of all findings between the initial consultation and the eighth treatment for Group 2

	Group 2 : Acupuncture Treatment						
	Initial Consultation			P - Value	Eighth Treatment		
	Mean	Standard Deviation	Standard Error		Mean	Standard Deviation	Standard Error
Cough Least	15.6660	12.9370	3.3404	0.0268	5.0000	9.8198	2.5354
Cough Worst	54.6666	29.7289	7.6759	0.0328	14.3333	20.4299	5.2749
Post Nasal Drip Least	32.0000	24.5531	6.3395	0.1814	15.3333	21.0837	5.4437
Post Nasal Drip Worst	73.8666	21.2295	5.4814	0.0005	28.6666	29.4876	7.6136
Severity of Headache	3.4000	0.9856	0.2544	0.0014	1.9333	1.0997	0.2839
Type of Headache	3.7333	0.8837	0.2281	0.0233	2.4000	1.4560	0.3754
Headache Position	3.0000	0.9258	0.2390	0.0233	2.0000	1.0690	0.2760
Power							
Cough Least				0.463			
Cough Worst				0.249			
Post Nasal Drip Least				0.354			
Post Nasal Drip Worst				0.967			
Severity of Headache				0.997			
Type of Headache				0.554			
Headache Position				0.554			

For cough at its least and worst, the post nasal drip at its least, the null hypothesis is accepted and one can conclude that at 95% confidence level, there was no significant subjective improvement between the initial consultation and eighth treatment.

For post nasal drip at its worst, severity of headache, type of headache and position of headache the null hypothesis is rejected and one can conclude that at 95% confidence level, there was significant subjective improvement between the initial consultation and eighth treatment.

In all instances above in both treatments, the standard deviation values, showing the spread of data around the mean, were similar enough to render the two sets of data reliable and comparable.

Table 12 - The results of Wilcoxon's signed-rank test comparing the statistical results of all findings between the initial consultation and the one month follow-up treatment for Group 2

	Group 2 : Acupuncture Treatment						
	Initial Consultation			P - Value	One month Follow-up		
	Mean	Standard Deviation	Standard Error		Mean	Standard Deviation	Standard Error
Cough Least	15.6660	12.9370	3.3404	0.0158	3.8000	10.3936	2.6836
Cough Worst	54.6666	29.7289	7.6759	0.0019	9.6666	15.5226	4.0079
Post Nasal Drip Least	32.0000	24.5531	6.3395	0.0098	13.0000	21.5307	5.5592
Post Nasal Drip Worst	73.8666	21.2295	5.4814	0.0003	26.0000	27.8516	7.1912
Severity of Headache	3.4000	0.9856	0.2544	0.0055	2.0000	1.1952	0.3086
Type of Headache	3.7333	0.8837	0.2281	0.0455	2.2666	1.4804	0.3837
Headache Position	3.0000	0.9258	0.2390	0.0044	1.9333	0.9611	0.2481
Power							
Cough Least				0.046			
Cough Worst				0.216			
Post Nasal Drip Least				0.979			
Post Nasal Drip Worst				0.999			
Severity of Headache				0.254			
Type of Headache				0.599			
Headache Position				0.581			

For type of headache the null hypothesis is accepted and one can conclude that at 95% confidence level, there was no significant subjective improvement between the initial consultation and one month follow-up treatment.

For cough at its least and worst, post nasal drip at its least and worst, severity of headache and position of headache the null hypothesis is rejected and one can conclude that at 95% confidence level, there was significant subjective improvement between the initial consultation and one month follow-up.

In all instances above in both treatments, the standard deviation values, showing the spread of data around the mean, were similar enough to render the two sets of data reliable and comparable.

Table 13 - The results of Wilcoxon's signed-rank test comparing the statistical results of all findings between the eighth treatment and the one month follow-up treatment for Group 2

	Group 2 : Acupuncture Treatment						
	Eighth Treatment			P - Value	One month follow-up		
	Mean	Standard Deviation	Standard Error		Mean	Standard Deviation	Standard Error
Cough Least	5.0000	9.8198	2.5354	1.0000	3.8000	10.3936	2.6836
Cough Worst	14.3333	20.4299	5.2749	0.7518	9.6666	15.5226	4.0079
Post Nasal Drip Least	15.3333	21.0837	5.4437	0.5049	13.0000	21.5307	5.5592
Post Nasal Drip Worst	28.6666	29.4876	7.6136	0.7518	26.0000	27.8516	7.1912
Severity of Headache	1.9333	1.0997	0.2839	1.0000	2.0000	1.1952	0.3086
Type of Headache	2.4000	1.4560	0.3754	1.0000	2.2666	1.4804	0.3837
Headache Position	2.0000	1.0690	0.2760	1.0000	1.9333	0.9611	0.2481
Power							
Cough Least				0.065			
Cough Worst				0.051			
Post Nasal Drip Least				0.049			
Post Nasal Drip Worst				0.051			
Severity of Headache				0.065			
Type of Headache				0.065			
Headache Position				0.065			

For cough at its least and worst, post nasal drip at its least and worst, severity of headache and position of headache and type of headache the null hypothesis is accepted and one can conclude that at 95% confidence level, there was no significant subjective improvement between the initial consultation and one month follow-up treatment.

In all instances above in both treatments, the standard deviation values, showing the spread of data around the mean, were similar enough to render the two sets of data reliable and comparable

4.4.2 Inter Group Analysis: Mann-Whitney unpaired two tailed tests.

This test was used evaluate whether there was a difference in relative effectiveness of either of the two experimental groups.

4.4.2.1 Analysis of objective findings

Table 14: The results of the Mann-Whitney U Test comparing the statistical objective findings of Group 1 and Group 2 at the Initial Consultation.

	Initial Consultation						
	Chiropractic			P - Value	Acupuncture		
	Mean	Standard Deviation	Standard Error		Mean	Standard Deviation	Standard Error
Nasal Mucosal Colour	1.8666	0.7432	0.1918	0.0079	2.6666	0.7237	0.1868
Facial Swelling	3.1333	0.5163	0.1333	0.0233	3.6000	0.5070	0.1309
Mucosal Swelling	3.1333	0.5163	0.1333	0.0233	3.6000	0.5070	0.1309
Power							
Nasal Mucosal Colour				0.8220			
Facial Swelling				0.6716			
Mucosal Swelling				0.6716			

The null hypothesis is rejected, which indicates that at $\alpha = 0.05$ level of significance there was statistically a significant difference between Group 1 and 2 at the Initial Consultation. The chiropractic group were initially less severe symptomatically than the acupuncture group.

In all instances above in both treatments, the standard deviation values, showing the spread of data around the mean, were similar enough to render the two sets of data reliable and comparable.

Table 15: The results of the Mann-Whitney U Test comparing the statistical objective findings of Group 1 and Group 2 at the Eighth Treatment.

	Eighth Treatment						
	Chiropractic			P - Value	Acupuncture		
	Mean	Standard Deviation	Standard Error		Mean	Standard Deviation	Standard Error
Nasal Mucosal Colour	1.3330	0.6172	0.1593	0.3553	1.1333	0.3518	0.0908
Facial Swelling	2.2666	0.8837	0.2281	0.1375	1.8000	0.9411	0.2429
Mucosal Swelling	2.2000	0.8618	0.2225	0.1803	1.8000	0.9411	0.2429
Power							
Nasal Mucosal Colour				0.1729			
Facial Swelling				0.2619			
Mucosal Swelling				0.2070			

The null hypothesis is accepted, which indicates that at $\alpha = 0.05$ level of significance there was statistically no significant difference between Group 1 and 2 after eight treatments.

In all instances above in both treatments, the standard deviation values, showing the spread of data around the mean, were similar enough to render the two sets of data reliable and comparable.

Table 16: The results of the Mann-Whitney U Test comparing the statistical findings of Group 1 and Group 2 at the One Month Follow-up.

	One Month Follow-up						
	Chiropractic			P - Value	Acupuncture		
	Mean	Standard Deviation	Standard Error		Mean	Standard Deviation	Standard Error
Nasal Mucosal Colour	1.0000	0.0000	0.0000	0.3506	1.0666	0.2581	0.0666
Facial Swelling	1.8666	0.7432	0.1918	0.6562	1.8000	0.9411	0.2429
Mucosal Swelling	1.8000	0.7745	0.2000	0.7549	1.9333	0.8837	0.2281
Power							
Nasal Mucosal Colour				0.8220			
Facial Swelling				0.6716			
Mucosal Swelling				0.6716			

The null hypothesis is accepted, which indicates that at $\alpha = 0.05$ level of significance there was statistically no significant difference between Group 1 and 2 at the one month follow-up appointment.

In all instances above in both treatments, the standard deviation values, showing the spread of data around the mean, were similar enough to render the two sets of data reliable and comparable.

Table 17: The results of the Mann-Whitney U Test comparing the statistical subjective findings of Group 1 and Group 2 at the Initial Consultation

	Initial Consultation						
	Chiropractic			P - Value	Acupuncture		
	Mean	Standard Deviation	Standard Error		Mean	Standard Deviation	Standard Error
Cough Least	12.6660	19.0737	4.9248	0.2620	15.6660	12.9370	3.3404
Cough Worst	36.3330	31.6491	8.1717	0.1126	54.6666	29.7289	7.6759
Post Nasal Drip Least	21.3330	16.4171	4.2388	0.1836	32.0000	24.5531	6.3395
Post Nasal Drip Worst	59.7333	24.0900	6.2201	0.1492	73.8666	21.2295	5.4814
Severity of Headache	3.8666	0.7432	0.1918	0.2358	3.4000	0.9856	0.2544
Type of Headache	4.1333	0.5163	0.1333	0.1796	3.7333	0.8837	0.2281
Headache Position	3.0000	0.5345	0.1380	0.8168	3.0000	0.9258	0.2390
Power							
Cough Least				0.0751			
Cough Worst				0.3418			
Post Nasal Drip Least				0.2818			
Post Nasal Drip Worst				0.3672			
Severity of Headache				0.2826			
Type of Headache				0.2992			
Headache Position				0.5000			

The null hypothesis is accepted, which indicates that at $\alpha = 0.05$ level of significance there was statistically no significant difference between Group 1 and 2 at the Initial Consultation. The chiropractic and acupuncture groups seemed to be of the same level of severity at the initial consultation and therefore any benefit shown by the treatment can be easily assessed.

In all instances above in both treatments, the standard deviation values, showing the spread of data around the mean, were similar enough to render the two sets of data reliable and comparable.

Table 18: The results of the Mann-Whitney U Test comparing the statistical subjective findings of Group 1 and Group 2 at the Eighth Treatment

	Eighth Treatment						
	Chiropractic			P - Value	Acupuncture		
	Mean	Standard Deviation	Standard Error		Mean	Standard Deviation	Standard Error
Cough Least	2.3333	5.6273	1.6592	0.5947	5.0000	9.8198	2.5354
Cough Worst	14.6666	18.0739	4.6666	0.9473	14.3333	20.4299	5.2749
Post Nasal Drip Least	11.6666	16.2200	4.1880	0.7751	15.3333	21.0837	5.4437
Post Nasal Drip Worst	53.3330	27.2200	7.0282	0.4745	28.6666	29.4876	7.6136
Severity of Headache	2.2666	1.0327	0.2666	0.3703	1.9333	1.0997	0.2839
Type of Headache	2.5333	1.3557	0.3500	0.7387	2.4000	1.4560	0.3754
Headache Position	2.2660	1.0327	0.2666	0.4907	2.0000	1.0690	0.2760
Power							
Cough Least				0.1359			
Cough Worst				0.0502			
Post Nasal Drip Least				0.7820			
Post Nasal Drip Worst				0.9140			
Severity of Headache				0.1251			
Type of Headache				0.0565			
Headache Position				0.0986			

The null hypothesis is accepted, which indicates that at $\alpha = 0.05$ level of significance there was statistically no significant difference between Group 1 and 2 after eight treatments.

In all instances above in both treatments, the standard deviation values, showing the spread of data around the mean, were similar enough to render the two sets of data reliable and comparable.

Table 19: The results of the Mann-Whitney U Test comparing the statistical subjective findings of Group 1 and Group 2 at the One Month Follow-up

	One Month Follow-up						
	Chiropractic			P - Value	Acupuncture		
	Mean	Standard Deviation	Standard Error		Mean	Standard Deviation	Standard Error
Cough Least	3.3333	5.8756	1.5170	0.6819	3.8000	10.3936	2.6836
Cough Worst	13.9333	19.6776	5.0807	0.7798	9.6666	15.5226	4.0079
Post Nasal Drip Least	8.6666	13.4252	3.4663	0.3791	13.0000	21.5307	5.5592
Post Nasal Drip Worst	27.6660	24.3388	6.2842	0.8019	26.0000	27.8516	7.1912
Severity of Headache	2.0666	1.1629	0.3002	0.8429	2.0000	1.1952	0.3086
Type of Headache	2.6666	1.4960	0.3862	0.4715	2.2666	1.4804	0.3837
Headache Position	2.3333	1.0465	0.2702	0.2858	1.9333	0.9611	0.2481
Power							
Cough Least				0.0522			
Cough Worst				0.0936			
Post Nasal Drip Least				0.0939			
Post Nasal Drip Worst				0.0529			
Severity of Headache				0.0523			
Type of Headache				0.1046			
Headache Position				0.1751			

The null hypothesis is accepted, which indicates that at $\alpha = 0.05$ level of significance there was statistically no significant difference between Group 1 and 2 at the one month follow-up appointment.

In all instances above in both treatments, the standard deviation values, showing the spread of data around the mean, were similar enough to render the two sets of data reliable and comparable.

CHAPTER 5

DISCUSSION

5.1 INTRODUCTION

This chapter will discuss the results of the subjective and objective data in sections set out below and will focus on the author's interpretations of these results.

1) INTRAGROUP ANALYSIS

The assessment of the intragroup results from the first treatment to the final treatment represents the relative effectiveness of the treatment protocol in the treatment of chronic sinusitis. The comparison of the final treatment to the one month follow-up consultation indicates whether or not the treatment's relative effectiveness was maintained. The first treatment to the one month follow-up consultation serves to indicate the relative long term effectiveness and to whether the problem has returned or not.

2) INTERGROUP ANALYSIS

The evaluation of the first treatment measurements, shows any variance in the subjective and objective findings between the two groups in terms of their original signs and symptoms. The comparison of the final treatments confirms which treatment is more effective. Appraisal of the one month follow-up treatment measurements represent which treatment method has maintained its influence on symptomatology more effectively.

The author will attempt to highlight the difficulties and limitations within this study and statistics in general. This will be an attempt to convince the examiner of the author's understanding of statistical concepts and their usage, as well as supplying the reader with a more comprehensive insight into the nature of the results.

5.2 INTRAGROUP ANALYSIS

5.2.1 SEVERITY OF HEADACHE IN GROUP 1 (chiropractic): It was found that there was a significant improvement between the initial consultation and after eight treatments (Table 8). The mean showed 1.6 improvement (initial consultation - 3.8666 to after eight treatments - 2.2666). There was no statistically significant improvement between the eighth treatment and the one month follow-up appointment (Table 10). There was according to the mean however, a slight (0.2) decrease in symptomatology between the eighth treatment and the one month follow-up appointment (8 treatments - 2.266 to one month follow-up 2.0666). Thus, good improvement is seen in this category with the chiropractic intervention but, the relative lasting potential is questionable.

5.2.2 HEADACHE POSITION IN GROUP 1: There was statistically no significant improvement in the headache position between the initial consultation and after eight treatments (Table 8). The mean did show a 0.73 improvement (initial - 3.0000 to 8 treatments - 2.2660). There was also no improvement found between the eighth treatment and the one month follow-up appointment (Table 10). There was according to the mean a slight increase in symptomatology of 0.07 (8 treatments - 2.2660 to one month follow-up - 2.3333). Thus, we can deduce that the position of the headache did change with chiropractic treatment, however, not significantly and not for any length of time.

5.2.3 TYPE OF HEADACHE IN GROUP 1: There was no statistically significant change or improvement in the type of headache that the patients experienced in this group from the initial consultation, after eight treatments and at the one month follow-up appointment (Tables 8 and 10). There was a mean improvement of 1.6 between the initial consultation and after eight treatments (initial - 4.1333 to 8 treatments - 2.5333)

and there was a slight increase in symptomatology according to the mean between the eighth treatment and the one month follow-up appointment of 0.13 (8 treatments - 2.5333 to one month follow-up 2.6666). Therefore, it can be said that chiropractic treatment does alter the type of headache experienced by a chronic sinusitis sufferer, but, does not seem to benefit the patient for any length of time once treatment has ceased.

5.2.4 POST NASAL DRIP AT ITS WORST IN GROUP 1: This symptom showed statistically a significant improvement between the initial consultation and after eight treatments (Table 8). There was a mean improvement of 6.4 (initial - 59.7333 to 8 treatments - 53.3330). There was no improvement in symptomatology between the eighth treatment and the one month follow-up appointment, however there was a large mean improvement of 25.67 (8 treatments - 53.3330 to one month follow-up - 27.6660)(Table 10).

5.2.5 POST NASAL DRIP AT ITS LEAST IN GROUP 1: There was statistically a significant improvement between the initial consultation and after eight treatments (Table 8). There was a mean improvement of 9.67 (initial - 21.3330 to 8 treatments - 11.6666). There was however, no statistically significant improvement between the eighth treatment and the one month follow-up appointment (Table 10). The mean did show an improvement of 3.0 (8 treatments - 11.6666 to one month follow-up 8.6666). Chiropractic treatment has a significant positive effect on the post nasal drip experienced by the patient both at its least and its worst , it also seems to have a greater lasting potential, allowing the patient to remain relatively symptom free for a while once treatment has ceased.

5.2.6 COUGH AT ITS WORST IN GROUP 1: There was statistically a significant improvement between the initial consultation and after eight treatments in the severity of the cough that the patient experienced (Table 8). There was a mean improvement of 21.6 (initial - 36.3330 to 8 treatments 14.6666). There was no significant improvement between the eighth treatment and the one month follow-up appointment (Table 10). The mean did however, show a slight improvement of 0.7 (8 treatments - 14.6666 to one month follow-up 13.9333). Thus we can deduce that chiropractic treatment does reduce the severity of the cough experienced by a chronic sinusitis sufferer but the lasting effect seems to be negligible.

5.2.7 COUGH AT ITS LEAST IN GROUP 1: There was statistically no significant improvement between the initial consultation and after eight treatments in the cough at its least experienced by the patients in this group (Table 8). There was however, a large mean improvement of 10.3 (initial - 12.6660 to 8 treatments - 2.3333) after treatment. There was also no statistically significant improvement in symptomatology between the eighth treatment and the one month follow-up appointment (Table 10), there was actually an increase in symptoms according to the mean which showed a 1 difference (8 treatment - 2.3333 to one month follow-up - 3.3333). Therefore, the cough at its least was not positively influenced by chiropractic treatment.

The chance of committing Type II error (β) increases the smaller the sample size.

- Power is $(1 - \beta)$.
- The chance of not "getting it wrong". (ie. "getting it right")
- So the smaller β , the greater the power.

For example, a low power of 20 means that, 20 times out of 100 you are getting the right answer and 80% chance of missing the difference you are looking for. Thus the results found in this particular research are not entirely conclusive.

When we look at the relevant power of each symptom in Group 1. We can see that the power of the tests are overall very weak. This shows that the chance of missing possible statistical significant results, is high. If the sample size had in fact been larger the null hypothesis might have been accepted fewer times. Showing that there might have been an improvement between treatment intervals.

5.2.8 SEVERITY OF HEADACHE IN GROUP 2 (acupuncture): There was statistically a significant improvement in the severity of headaches experienced by this group after eight treatments (Table 11). There was a mean improvement of 1.4 (initial - 4.3 to 8 treatments - 1.9333). There was however, no statistically significant improvement in subjective symptoms experienced by the patients between the eighth treatment and the one month follow-up (Table 13). There was actually a slight increase in symptoms according to the mean which was 0.07 (8 treatments -1.9333 to one month follow-up - 2.000). Thus acupuncture seems to reduce the severity of headache experienced by the patient, however, the lasting potential is questionable.

5.2.9 HEADACHE POSITION IN GROUP 2: There was statistically a significant improvement in the position of the headache experienced by this group after eight treatments (Table 11). The mean showed an improvement of 1 (initial - 3 to 8 treatments - 2). There was no significant improvement in position of the headache between the eighth treatment and the one month follow-up (Table 13). The mean did however, show a slight improvement of 0.7 (8 treatments - 2 to one month follow-up - 1.9333). Therefore acupuncture treatment seems to shift the headache position experienced by the patient, however with obviously little continued effect once the treatment is ceased.

5.2.10 TYPE OF HEADACHE IN GROUP 2: There was statistically a significant improvement in the type of headache experienced by this group after eight treatments

(Table 11). There was a mean improvement of 1.3 (initial - 3.7333 to 8 treatments - 2.4). There was no statistically significant improvement between the eighth treatment and the one month follow-up (Table 13). There was a slight improvement of the mean of 0.13 (8 treatments - 2.4 to one month follow-up - 2.2666). The type of headache was positively influenced through acupuncture, however, it did not seem to have any relative long term benefits.

5.2.11 POST NASAL DRIP AT ITS WORST IN GROUP 2: There was statistically a significant improvement in the severity of the post nasal drip at its worst after the patient had eight treatments (Table 11). The mean showed an improvement of 45.2 (initial - 73.8666 to 8 treatments - 28.666). There was no statistically significant improvement in the post nasal drip at its worst between the eighth treatment and the one month follow-up (Table 13). There was a mean improvement of 2.6 (8 treatments - 28.666 to one month follow-up 26). Thus, we can deduce that the post nasal drip at its worst was reduced but, obviously with little long term benefits.

5.2.12 POST NASAL DRIP AT ITS LEAST IN GROUP 2: There was no statistically significant improvement in the post nasal drip at its least throughout the treatment in this group (Tables 11 and 13). There was a mean improvement of 16.67 after eight treatments (initial - 32 to 8 treatments - 15.3333) as well as a mean improvement after the eighth treatment at the one month follow-up of 2.3 (8 treatments - 15.33 to one month follow-up - 13). Although statistically acupuncture does not seem to benefit the patients post nasal drip at its least, it does have a slight benefit as well as a greater lasting potential.

5.2.13 COUGH AT ITS WORST IN GROUP 2: There was no statistically significant improvement in this group after eight treatments (Table 11). There was quite a large mean improvement of 40.3 (initial - 54.666 to 8 treatments - 14.3333). There was also

5.2.14 COUGH AT ITS LEAST IN GROUP 2: There was no statistically significant improvement in this group throughout the whole treatment (Tables 11 and 13). There was however, a mean improvement after eight treatments of 10.6 (initial - 15.6660 to 8 treatments - 5) as well as a mean improvement of 1.2 between the eighth treatment and the one month follow-up appointment (8 treatments - 5 to one month follow-up - 3.8). Acupuncture seems to have a very slight benefit with regards to the cough experienced by the patient, however, yet again it does not seem to be able to continue to benefit the patient once the treatment is ceased.

Again when we look at the relevant power pertaining to the symptoms in Group 2. We can see that the power of the tests are overall very weak. This therefore shows that the chance of missing possible statistically significant results, is high. If the sample size had in fact been larger, again the null hypothesis might probably have been accepted less often. Showing that there possibly would have been an improvement between treatment intervals.

5.3 INTERGROUP ANALYSIS

At the initial consultation there was statistically no significant difference between the two groups with regards to nasal mucosal colour, facial swelling, mucosal swelling, cough at its least and worst, post nasal drip at its least and worst, severity, type and position of headache.

5.3.1 NASAL MUCOSAL COLOUR

At the initial consultation there was a mean difference of 0.8 between the two groups (chiropractic 1.8666 - acupuncture 2.666) (table 14). Thus the acupuncture group started off slightly more severe than the chiropractic group. However, after eight treatments there was a mean difference of 0.19 between the two groups (chiropractic 1.3330 - acupuncture 1.1333) (table 15) so we can deduce that although statistically there was no significant difference between the two treatment protocols, the acupuncture group showed a more significant improvement compared to the chiropractic group. But, the acupuncture group did not seem to hold this improvement long term wise in relation to the chiropractic group as there was a mean difference of 0.066 in favour of chiropractic (chiropractic 1.000 - acupuncture 1.0666) (table 16) although both groups did show a continued improvement.

5.3.2 FACIAL SWELLING

At the initial consultation there was a mean difference of 0.466 between the two groups (chiropractic 3.1333 - acupuncture 3.600) (table 14). The acupuncture group was thus marginally more severe than the chiropractic group. The acupuncture group however showed a greater improvement after eight treatments than the chiropractic group, showing a mean difference of 0.4666 (chiropractic 2.2666 - acupuncture 1.8000)

(table 15) as well as taking into consideration that the acupuncture group initially was more severe symptomatically than the chiropractic group. The acupuncture group also showed a greater long term potential than the chiropractic group, with a mean difference of 0.0666 although very marginal (chiropractic 1.866 - acupuncture 1.800) (table 16).

5.3.3 MUCOSAL SWELLING

At the initial consultation the mucosal swelling in the chiropractic group was slightly less severe than in the acupuncture group showing a mean difference of 0.467 (chiropractic 3.133 - acupuncture 3.600) (table 14). After eight treatments the acupuncture group showed a greater improvement than the chiropractic group showing a mean difference of 0.4 (chiropractic 2.2000 - acupuncture 1.800) (table 15). However, long term lasting potential the chiropractic group seemed to do better showing a mean difference of 0.1 (chiropractic 1.800 - acupuncture 1.933) (table 16). It is important to take into consideration that the acupuncture group did start off more severe.

5.3.4 COUGH AT ITS LEAST

The initial consultation showed a greater severity in symptoms in the acupuncture group compared to the chiropractic group with a mean difference of 3.00 (chiropractic 12.666 - acupuncture 15.666) (table 17). There was a slight overall improvement in the cough at its least in both groups with neither group being significantly more improved than the other (table 18). Long term wise however, showed that the chiropractic group maintained their improvement more successfully than the acupuncture group, showing a mean difference of 0.467 (chiropractic 3.333 - acupuncture 3.800) (table 19). Thus chiropractic seems to be overall of greater benefit at reducing the cough at its least than acupuncture.

5.3.5 COUGH AT ITS WORST

At the initial consultation the acupuncture group was significantly more severe than the chiropractic group showing a mean difference of 18.333 (chiropractic 36.3330 - acupuncture 54.6666) (table 17). After eight treatments the acupuncture group improved symptomatically much more than the chiropractic group, there was a mean difference of 0.333 (chiropractic 14.666 - acupuncture 14.333) (table 18), but the acupuncture group did start off significantly more severe than the chiropractic group. Maintenance over a long term period showed that the acupuncture group seemed to be more successful in that there was a mean difference of 4.267 (chiropractic 13.9333 - acupuncture 9.6666) (table 19). Thus acupuncture seemed to be of greater benefit to a severe cough than chiropractic, but chiropractic seemed to be of greater benefit to a cough at its least.

5.3.6 POST NASAL DRIP AT ITS LEAST

The acupuncture group was more severe symptomatically compared to the chiropractic group at the initial consultation, showing a mean difference of 10.667 (chiropractic 21.3330 - acupuncture 32.0000) (table 17). The acupuncture group showed a greater improvement after eight treatments than the chiropractic group, although there was no statistically significant difference. There was a mean difference of 3.6667 in favour of the chiropractic group (chiropractic 11.6666 - acupuncture 15.3333) (table 18). But, the acupuncture group did start off significantly more severe than the chiropractic group, so we can safely say that acupuncture seems to have a better effect on the post nasal drip at its least than chiropractic.

After one month follow-up both groups showed a continued improvement in their post nasal drip at its least with the chiropractic group showing a greater long term improvement than the acupuncture group. There was a mean difference of 4.334 (chiropractic 8.666 - acupuncture 13.000) (table 19). Thus chiropractic treatment seems to take longer to show results, but has a longer duration of improvement.

5.3.7 POST NASAL DRIP AT ITS WORST

The acupuncture group seemed to be more severe symptomatically than the chiropractic group at the initial consultation showing a mean difference of 14.133 (chiropractic 59.7333 - acupuncture 73.8666) (table 17). The acupuncture group showed a significant improvement after eight treatments with the chiropractic group only showing a marginal improvement in the post nasal drip. There was a mean difference of 24.667 (chiropractic 53.3330 - acupuncture 28.666) (table 18). Taking into consideration as well that the acupuncture group started off with more severe symptoms and after eight treatments showed less severe post nasal drip than the chiropractic group.

There was a slight continued improvement at the one month follow-up with the acupuncture group but a much greater continued improvement in the chiropractic group. There was a mean difference of 1.666 (chiropractic 27.666 - acupuncture 26.000) (table 19). Therefore, chiropractic seems to have a greater long term benefit than acupuncture.

5.3.8 SEVERITY OF HEADACHE

At the initial consultation the chiropractic group started off more severe than the acupuncture group, with a mean difference of 0.466 (chiropractic 3.8666 - acupuncture 3.400) (table 17). After eight treatments however, the acupuncture group seemed to respond better than the chiropractic group, showing a mean difference of 0.3333 (chiropractic 2.2666 - acupuncture 1.9333) (table 18). Thus, acupuncture seems to be of greater benefit to the severity of headache experienced by sinusitis sufferers than chiropractic although it is marginal. At the one month follow-up the chiropractic group seemed to show a better continued improvement than the acupuncture group and is therefore of greater benefit over a long term period (chiropractic 2.0666 - acupuncture 2.000)(table 19). The acupuncture group actually got slightly worse once treatment ceased, whereas the chiropractic group showed slight improvement.

5.3.9 TYPE OF HEADACHE

At the initial consultation the chiropractic group was more severe than the acupuncture group with a mean difference of 0.4 (chiropractic 4.1333 - acupuncture 3.7333) (table 17). Both groups showed improvement after eight treatments, however, the chiropractic group showed a greater improvement than the acupuncture group. There was a mean difference of 0.1333 in favour of the acupuncture group, but the chiropractic group did start off worse symptomatically than the acupuncture group (chiropractic 2.5333 - acupuncture 2.4000) (table 18). The long term effect on the type of headache showed that the chiropractic group actually regressed slightly and the acupuncture group continued to improve slightly, however, statistically it is of no significance, both groups were better than they were prior to treatment (chiropractic 2.6666 - acupuncture 2.2666) (table 19).

5.3.10 HEADACHE POSITION

Both groups were of the same severity at the initial consultation with no mean difference (chiropractic 3.000 - acupuncture 3.000) (table 17). After eight treatments both groups showed improvement with the acupuncture group showing greater improvement than the chiropractic group. There was a mean difference between the two groups of 0.2660 (chiropractic 2.2660 - acupuncture 2.0000) (table 18). After one month follow-up the acupuncture group showed a slight continued improvement, however, the chiropractic group showed a slight increase in symptoms. There was a mean difference of 0.3997 in favour of the acupuncture group (chiropractic 2.333 - acupuncture 1.9333) (table 19). Therefore we can deduce that acupuncture for this particular symptom seems to have a greater long term benefit compare to chiropractic care.

CONCLUSION:

We can therefore conclude that overall the acupuncture treatment seemed to show greater improvement on the nasal mucosal colour, facial swelling and mucosal swelling compared to the chiropractic group, although there was no statistically significant difference. But, long term potential seems to be more positive with chiropractic treatment. Where the cough at its least and worst, post nasal drip at its least and worst, severity, type and position of headache are concerned there was overall an improvement in both groups, however the one month follow-up seemed to determine whether the treatment had any lasting potential or not. Generally speaking chiropractic treatment seemed to have a greater lasting potential than acupuncture treatment.

Statistically it was very difficult to calculate objective results thus making most of the results based on subjective analysis alone, which is not altogether very reliable or accurate. In future studies it would be of great benefit if a method of obtaining objective data could be devised, there is to date nothing that can conclusively and accurately diagnose or monitor sinusitis.

The power for all three assessment periods is weak. This means that even if there had been a difference between the groups, that because of the small sample size, it might have gone undetected.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

From the results it would appear that there is no statistically significant difference between the two treatment groups in the treatment of chronic sinusitis. Both groups tended to show a reduction in the symptoms that they were experiencing. This improvement tended to be maintained into the one month follow-up, but at a lower level than after the eighth treatment. Therefore, convenience should be a factor when choosing one of the treatment protocols.

In order for the findings to have a higher level of validity, a larger sample size would be recommended. A sample size of thirty subjects enables one to make inferences but one cannot really draw conclusions. It must also be acknowledged that a control group was not used in this study. Without a control group, it is quiet possible that neither treatment protocol is effective. The efficacy of both treatment options needs to be established and it is therefore recommended that both groups be compared separately to a control group in order to assess their relative effectiveness.

In a busy practice time will always be an important consideration. Acupuncture takes approximately 20-25 minutes. Chiropractic treatment takes about 10 minutes. The chiropractic treatment is therefore more time efficient. The cost of the needles required for the acupuncture treatment is also another factor to take into consideration, each needle costs approximately one rand, with chiropractic treatment there are no additional costs incurred. It is therefore the opinion of this author that chiropractic treatment is easier, less time consuming and more cost effective than acupuncture.

It is also the opinion of the author that chiropractic treatment was far more pleasant and therapeutic than the pain experienced with acupuncture, although the patients who had acupuncture found it quite comfortable once the needles had been inserted, and they also enjoyed the 20 minutes relaxation while the needles were in.

It is recommended that in a future study one group receive either chiropractic treatment or acupuncture treatment and compare it to a group who receives both chiropractic and acupuncture treatment. It might be further beneficial to take into consideration the patients lifestyle, possible exposure to allergins eg. tobacco smoke, pollen, chlorine etc. as well as diet eg. mucous producing foods such as dairy products, preservatives etc.

The author also feels that the experience and reliability of the examiner and the accuracy of measurement parameters should be taken into consideration. It is recommended that the issue of patient blinding, a control group and patient compliance also be addressed.

Considering the results within the study, it is the authors opinion that both methods of treating chronic sinusitis are as effective, although chiropractic treatment is easier, more time and cost effective. A larger sample size is essential to validate these findings and in future studies of this nature.

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ADDENDUM A

TABLE DISPLAYING THE SEQUENCE OF RANDOM TREATMENT ALLOCATION

PATIENT NUMBER 1	ACUPUNCTURE
PATIENT NUMBER 2	CHIROPRACTIC
PATIENT NUMBER 3	CHIROPRACTIC
PATIENT NUMBER 4	ACUPUNCTURE
PATIENT NUMBER 5	ACUPUNCTURE
PATIENT NUMBER 6	CHIROPRACTIC
PATIENT NUMBER 7	ACUPUNCTURE
PATIENT NUMBER 8	CHIROPRACTIC
PATIENT NUMBER 9	CHIROPRACTIC
PATIENT NUMBER 10	CHIROPRACTIC
PATIENT NUMBER 11	ACUPUNCTURE
PATIENT NUMBER 12	ACUPUNCTURE
PATIENT NUMBER 13	CHIROPRACTIC
PATIENT NUMBER 14	CHIROPRACTIC
PATIENT NUMBER 15	CHIROPRACTIC
PATIENT NUMBER 16	CHIROPRACTIC
PATIENT NUMBER 17	CHIROPRACTIC
PATIENT NUMBER 18	ACUPUNCTURE
PATIENT NUMBER 19	ACUPUNCTURE
PATIENT NUMBER 20	ACUPUNCTURE
PATIENT NUMBER 21	ACUPUNCTURE
PATIENT NUMBER 22	CHIROPRACTIC
PATIENT NUMBER 23	CHIROPRACTIC
PATIENT NUMBER 24	CHIROPRACTIC
PATIENT NUMBER 25	ACUPUNCTURE
PATIENT NUMBER 26	ACUPUNCTURE
PATIENT NUMBER 27	ACUPUNCTURE
PATIENT NUMBER 28	ACUPUNCTURE
PATIENT NUMBER 29	CHIROPRACTIC
PATIENT NUMBER 30	ACUPUNCTURE

ADDENDUM B

TECHNIKON NATAL CHIROPRACTIC DAY CLINIC
CASE HISTORY

Patient: _____ Date: _____
file #: _____ X-Ray#: _____
Age: _____ Sex: _____ Occupation: _____
Intern: _____ Signature: _____

FOR CLINICIAN'S USE ONLY

Initial visit clinician: _____ Signature: _____

Case History:

Examination:

Previous:

Current:

X-Ray Studies:

Previous:

Current:

Clinical Path. lab:

Previous:

Current:

Case Status:

PTT: Conditional: Signed Off: Final Sign out:

Recommendations:

Intern's Case History

1. Source of History:
2. Chief Complaint: (patient's own words)

3. Present Illness:

- ▶ Location
- ▶ Onset
- ▶ Duration
- ▶ Frequency
- ▶ Pain (Character)
- ▶ Progression
- ▶ Aggravating Factors
- ▶ Relieving Factors
- ▶ Associated S & S
- ▶ Previous Occurrences
- ▶ Past Treatment and Outcome

4. Other Complaints:

5. Past Medical History:

- ▶ General Health Status
- ▶ Childhood Illnesses
- ▶ Adult Illnesses
- ▶ Psychiatric Illnesses
- ▶ Accidents/Injuries
- ▶ Surgery
- ▶ Hospitalizations

6. Current health status and life-style:

- ▶ Allergies
- ▶ Immunizations
- ▶ Screening Tests
- ▶ Environmental Hazards (Home, School, Work)
- ▶ Safety Measures (seat belts, condoms)
- ▶ Exercise and Leisure
- ▶ Sleep Patterns
- ▶ Diet
- ▶ Current Medication
- ▶ Tobacco
- ▶ Alcohol
- ▶ Social Drugs

7. Immediate Family Medical History:

- ▶ Age
- ▶ Health
- ▶ Cause of Death
- ▶ DM
- ▶ Heart Disease
- ▶ TB
- ▶ Stroke
- ▶ Kidney Disease
- ▶ CA
- ▶ Arthritis
- ▶ Anaemia
- ▶ Headaches
- ▶ Thyroid Disease
- ▶ Epilepsy
- ▶ Mental Illness
- ▶ Alcoholism
- ▶ Drug Addiction
- ▶ Other

8. Psychosocial history:

- ▶ Home Situation and daily life
- ▶ Important experiences
- ▶ Religious Beliefs

9. Review of Systems:

- ▶ General
- ▶ Skin
- ▶ Head
- ▶ Eyes
- ▶ Ears
- ▶ Nose/Sinuses
- ▶ Mouth/Throat
- ▶ Neck
- ▶ Breasts
- ▶ Respiratory
- ▶ Cardiac
- ▶ Gastro-intestinal
- ▶ Urinary
- ▶ Genital
- ▶ Vascular
- ▶ Musculoskeletal
- ▶ Neurologic
- ▶ Haematologic
- ▶ Endocrine
- ▶ Psychiatric

PHYSICAL EXAMINATION

Patient: _____ File#: _____ Date: _____
 Clinician: _____ Signature: _____
 Intern: _____ Signature: _____

Pulse rate:

Respiratory

Respiratory rate:

Blood pressure: R L

Temperature:

Height:

Weight:

General Impression:

Skin:

Jaundice:

Pallor:

Clubbing:

Cyanosis (Central/Peripheral):

Oedema:

Lymph nodes - Head and neck:

- Axillary:

- Epitrochlear:

- Inguinal:

Urinalysis:

1) Is this patient in Cardiac Failure ?

2) Does this patient have signs of Infective Endocarditis ?

3) Does this patient have Rheumatic Heart Disease ?

Inspection - Scars

- Chest deformity:

- Precordial bulge:

- Neck -JVP:

Palpation: - Apex Beat (character + location):

- Right or left ventricular heave:

- Epigastric Pulsations:

- Palpable P2:

- Palpable A2:

- Pulses:
- General Impression:
 - Radio-femoral delay:
 - Carotid:
 - Radial:
 - Dorsalis pedis:
 - Posterior tibial:
 - Popliteal:
 - Femoral:

Percussion: - borders of heart

Auscultation: - heart valves (mitral, aortic, tricuspid, pulmonary)
- Murmurs (timing, systolic/diastolic, site, radiation, grade).

4. RESPIRATORY EXAMINATION

1) Is this patient in **Respiratory Distress** ?

Inspection - Barrel chest:
- Pectus carinatum/cavinatum:
- Left precordial bulge:
- Symmetry of movement:
- Scars:

Palpation - Tracheal symmetry:
- Tracheal tug:
- Thyroid Gland:
- Symmetry of movement (ant + post)
- Tactile fremitus:

Percussion - Percussion note:
- Cardiac dullness:
- Liver dullness:

Auscultation - Normal breath sounds bilat.:
- Adventitious sounds (crackles, wheezes, crepitations)
- Pleural frictional rub:
- Vocal resonance - Whispering pectoriloquy:
- Bronchophony:
- Egophony:

5. ABDOMINAL EXAMINATION

1) Is this patient in **Liver Failure** ?

Inspection - Shape:
- Scars:
- Hernias:

Palpation - Superficial:
- Deep = Organomegally:

- Masses (intra- or extramural)
- Aorta:

Percussion - Rebound tenderness:
 - Ascites:
 - Masses:

Auscultation - Bowel sounds:
 - Arteries (aortic, renal, iliac, femoral, hepatic)

Rectal Examination - Perianal skin:
 - Sphincter tone & S4 Dermatome:
 - Obvious masses:
 - Prostate:
 - Appendix:

6. G.U.T EXAMINATION

External genitalia:
 Hernias:
 Masses:
 Discharges:

7. NEUROLOGICAL EXAMINATION

Gait and Posture - Abnormalities in gait:
 - Walking on heels (L4-L5):
 - Walking on toes (S1-S2):
 - Rombergs test (Pronator Drift):

Higher Mental Function - Information and Vocabulary:
 - Calculating ability:
 - Abstract Thinking:

G.C.S.: - Eyes:
 - Motor:
 - Verbal:

Evidence of head trauma:

Evidence of Meningism: - Neck mobility and Brudzinski's sign:
 - Kernigs sign:

Cranial Nerves:

I Any loss of smell/taste:
 Nose examination:

II External examination of eye: - Visual Acuity:
 - Visual fields by confrontation:

- Forearm = Supination & Pronation:
 - Fingers = Extension (Interphalangeals & M.C.P's):
 - Thumb = Opposition:
 - Hip = Flexion & Extension:
 - = Adduction & Abduction:
 - Knee = Flexion & Extension:
 - Foot = Dorsiflexion & Plantar flexion:
 - = Inversion & Eversion:
 - = Toe (Plantarflexion & Dorsiflexion):
- b. Tone
- Shoulder:
 - Elbow:
 - Wrist:
 - Lower limb - Int. & Ext. rotation:
 - Knee clonus:
 - ankle clonus:
- c. Reflexes
- Biceps:
 - Triceps:
 - Supinator:
 - Knee:
 - Ankle:
 - Abdominal:
 - Plantar:

Sensory System:

- a. Dermatomes
- Light touch:
 - Crude touch:
 - Pain:
 - Temperature:
 - Two point discrimination:
- b. Joint position sense
- Finger:
 - Toe:
- c. Vibration:
- Big toe:
 - Tibial tuberosity:
 - ASIS:
 - Interphalangeal Joint:
 - Sternum:

Cerebellar function:

- Obvious signs of cerebellar dysfunction:
- = Intention Tremor:
 - = Nystagmus:
 - = Truncal Ataxia:

- Pupillary light reflexes = Direct:
= Consensual:
- Fundoscopy findings:
- III Ocular Muscles:
Eye opening strength:
- IV Inferior and Medial movement of eye:
- V
 - a. Sensory
 - Ophthalmic:
 - Maxillary:
 - Mandibular:
 - b. Motor
 - Masseter:
 - Jaw lateral movement:
 - c. Reflexes
 - Corneal reflex
 - Jaw jerk
- VI Lateral movement of eyes
- VII
 - a. Motor
 - Raise eyebrows:
 - Frown:
 - Close eyes against resistance:
 - Show teeth:
 - Blow out cheeks:
 - b. Taste
 - Anterior two-thirds of tongue:
- VIII General Hearing:
 Rinnes = L: R:
 Webers lateralisation:
 Vestibular function
 - Nystagmus:
 - Rombergs:
 - Wallenbergs:
 Otoscope examination:
- IX & X
 - Gag reflex:
 - Uvula deviation:
 - Speech quality:
- XI
 - Shoulder lift:
 - S.C.M. strength:
- XII Inspection of tongue (deviation):

Motor System:

- a. Power
 - Shoulder = Abduction & Adduction:
= Flexion & Extension:
 - Elbow = Flexion & Extension:
 - Wrist = Flexion & Extension:

Finger-nose test (Dysmetria):
Rapid alternating movements (Dysdiadochokinesia):
Heel-shin test:
Heel-toe gait:
Reflexes:
Signs of Parkinsons:

8. **SPINAL EXAMINATION:**(See Regional examination)

Obvious Abnormalities:
Spinous Percussion:
R.O.M:
Other:

9. **BREAST EXAMINATION:**

Summon female chaperon.

Inspection - Hands rested in lap:
- Hands pressed on hips:
- Arms above head:
- Leaning forward:

Palpation - masses:
- tenderness:
- axillary tail:
- nipple:
- regional lymph nodes:

ADDENDUM D

TECHNIKON NATAL CHIROPRACTIC DAY CLINIC REGIONAL EXAMINATION - *CERVICAL SPINE*

Patient: _____ File: _____

Date: _____ Intern/Resident: _____

Clinician: _____ Sign: _____

OBSERVATION:

Posture
Swellings
Scars
Discolouration
Hair Line
Bony & Soft Tissue Contours

Shoulder position:

Left:

Right:

Muscle spasm

Facial expression

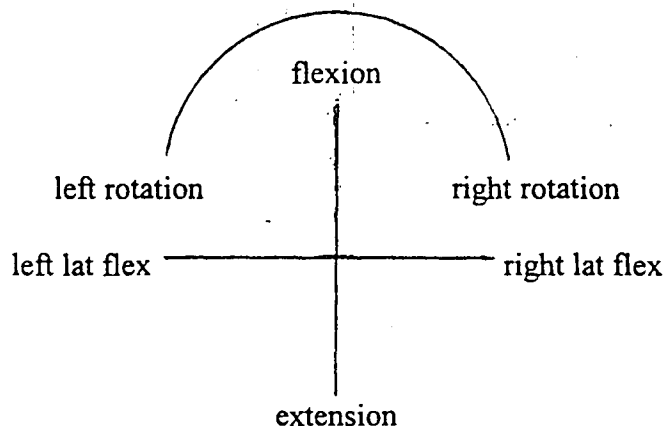
RANGE OF MOTION:

Flexion (45'):

L/R Rotation (70'):

Extension (70'):

L/R Lat Flex (45'):



PALPATION:

Lymph Nodes
Thyroid Gland

Trachea

ORTHOPAEDIC EXAMINATION:

Tenderness

Trigger Points:

SCM

Scalenii

Post Cervicals

Trapezius

Lev Scap

Doorbell sign

Kemp's test

Cervical distraction

Halstead's test

Hyperabduction test

Shoulder abduction test

Cervical compression

Lateral compression

Adson's test

Costoclavicular test

Eden's test

Shoulder depression test

Dizziness rotation test
Brachial plexus tension

Lhermitte's sign

NEUROLOGICAL EXAMINATION:

Dermatomes	Left	Right	Myotomes	Left	Right	Reflexes	Left	Right
C2			C1			C5		
C3			C2			C6		
C4			C3			C7		
C5			C4					
C6			C5					
C7			C6					
C8			C7					
T1			C8					
			T1					

VASCULAR:

	Left	Right
Blood Pressure		
Carotid arts.		
Subclavian arts.		
Wallenberg's test		

MOTION PALPATION & JOINT PLAY:

Left: Motion Palpation:
Joint Play:

Right: Motion palpation:
Joint Play:

Basic Exam: Shoulder:
Case History:

ROM: Active:
Passive:
RIM:

Orthopaedic/Neuro/
Vascular:
Observ/Palpation:

Upper T horacics:
Motion Palpation:
Joint Play:

Basic Exam: Thoracic Spine:
Case History:

ROM: Motion Palp:
Active:
Passive:

Orthopaedic/Neuro/
Vascular:
Observ/Palpation:

ADDENDUM E

GB 14

St 2
Li 20

CV 24

L7

Li 4

St 40

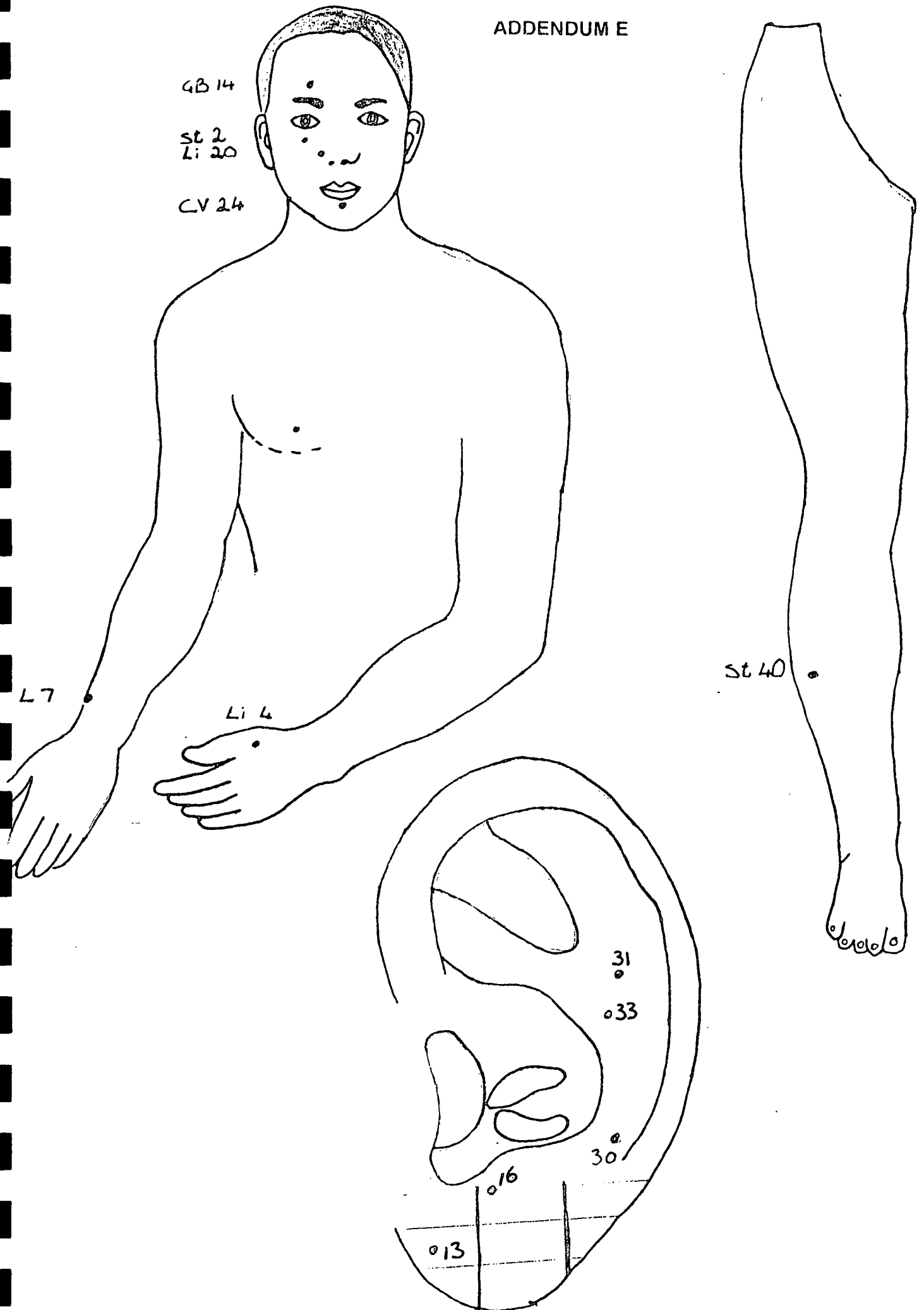
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033

30

016

013



ADDENDUM F

Dear participant,

I am conducting a research project in order to investigate the efficacy of two alternative treatments for chronic sinusitis, namely acupuncture and chiropractic adjustment.

Should you wish to participate in this trial, you will be placed in a group which will either receive acupuncture treatment or in a group which will receive chiropractic adjustment, this will be done by random selection.

I would also like to request that you cease any medication for the treatment of chronic sinusitis forty eight hours prior to when treatment is due to commence and throughout the treatment programme, this will help to give us accurate results pertaining to the treatment administered.

If you have any further questions, please do not hesitate to consult with me.

Yours faithfully,

NICOLE DESCOINS

INFORMED CONSENT FORM

(To be completed inn duplicate by patient/subject*) *Delete whichever is not applicable.

TITLE OF RESEARCH

NAME OF SUPERVISOR

NAME OF RESEARCH STUDENT

PLEASE CIRCLE THE APPROPRIATE ANSWER

- | | | |
|----|---|--------|
| 1. | Have you read the research information sheet | YES/NO |
| 2. | Have you had an opportunity to ask questions this study? | YES/NO |
| 3. | Have you received satisfactory answers to your questions? | YES/NO |
| 4. | Have you had an opportunity to discuss this study? | YES/NO |
| 5. | Have you received enough information about this study? | YES/NO |
| 6. | Do you understand the implications of your Involvement in this study? | YES/NO |
| 7. | Do you understand that you are free to withdraw from this study? | YES/NO |
| | (a) at any time | |
| | (b) without having to give a reason for withdrawing, and | |
| | (c) without affecting your future health care. | |
| 8. | Do you agree to voluntarily participate in this study? | YES/NO |
| 9. | Do you realise that you will need to refrain from taking any medication for your sinusitis symptoms | YES/NO |

PATIENT/SUBJECT*Name_____Signature_____
(in block letters)

PARENT/GUARDIAN*Name_____Signature_____
(in block letters)

WITNESS Name_____Signature_____
(in block letters)

RESEARCH STUDENT Name_____Signature_____
(In block letters)

DATE_____

ADDENDUM G

SINUSITIS RATING SCALE

DATE _____

PATIENTS NAME: _____ FILE NO. _____

This questionnaire has been designed to give the researcher information pertaining to the level of discomfort experienced by you:

- a) Prior to treatment
- b) After eight treatment sessions
- c) One month follow up

LOCATION OF HEADACHE

Please mark on the diagram the location of your headache with the use of the following:



- X = mild pain
- Y = moderate pain
- Z = severe pain

TYPE OF HEADACHE

Dull	Throbbing	Stabbing	Tight Pressure	Aching	Burning

SEVERITY OF HEADACHE

0	1	2	3	4
No Discomfort	Slight Discomfort	Moderate Discomfort	Severe Discomfort	Excruciating Discomfort

NUMERICAL POST NASAL DRIP SCALE

Please indicate on the line below, the number between 0 and 100 that best describes the post nasal drip you experience when it is at its worst. A zero (0) would mean "no post nasal drip at all", and one hundred (100) would mean "post nasal drip as bad as it could be". Please write only one number.

Please indicate on the line below, the number between 0 and 100 that best describes the post nasal drip you experience when it is at its least. A zero (0) would mean "no post nasal drip at all", and one hundred (100) would mean "post nasal drip as bad as it could be". Please write only one number.

NUMERICAL COUGH RATING SCALE

Please indicate on the line below, the number between 0 and 100 that best describes the cough you experience when it is at its worst. A zero (0) would mean "no cough at all", and one hundred (100) would mean "cough as bad as it could be". Please write only one number.

Please indicate on the line below, the number between 0 and 100 that best describes the cough you experience when it is at its least. A zero (0) would mean "no cough at all", and one hundred (100) would mean "cough as bad as it could be". Please write only one number.

ADDENDUM H

DATE _____

PATIENT'S NAME _____ FILE NO. _____

This questionnaire has been designed to give the researcher information pertaining to the level of discomfort experienced by the patient.

- a) Prior to treatment
- b) After eight treatment sessions
- c) One month follow up

MUCOSAL SWELLING (assessed with the aid of a nasal speculum)

None	Mild	Moderate	Severe

FACIAL SWELLING (assessed by palpation)

None	Mild	Moderate	Severe

CHANGES IN NASAL MUCOSAL COLOUR

Pale	Green	Yellow	Red