13 Spinal Management for the Patient with a Visceral Concomitant

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Statistics on the percentage of visceral disorders (Type O) managed by chiropractors indicate a decline in the number of patients presenting to clinics with these complaints. In 1979, the number of patients presenting with a Type O disorder was 14%. For 1989 this number had declined to approximately 8% (1). Should this trend continue, by 1995 there will be few patients with these disorders being treated by chiropractors. This trend may be a result of a declining emphasis on visceral management by many chiropractic colleges. Recently, however, material on visceral disorders related to the spine has surfaced in the literature (2,3). If the chiropractic approach to low back pain had been abandoned early on due to the lack of research data, we would have never known its superiority to other conservative measures (4).

For the confident practitioner familiar with the management of visceral disorders, each case represents a chance to become reacquainted with the neuroanatomy and neurophysiology of the particular disease. The tasks of determining the primary levels of involvement, of adjusting them in a specific manner, and of monitoring the patient during resolution of the dysfunction become daily occurrences. The practitioner—with little clinical experience or one without a systematic approach—will find patient management to be an awkward exercise. Confidence is replaced with uncertainty and treatment becomes referral. For those who wish to take on this aspect of chiropractic practice, both challenges and rewards are plentiful.

CLINICAL OBSERVATIONS

Gonstead’s empirical work with numerous patients during 55 years in practice are the foundation of our approach to a given condition. (Doctors who followed Gonstead’s career found that he treated personally between 150 and 200 patients six and a half days per week. Gonstead worked at least 18 hours a day, usually not going to bed on the same day that he awoke. An 8-hour shift was considered half a Norwegian workday. The reception area at the Gonstead Clinic in Mt. Horeb, Wisconsin has seating for 106 patients (5).) Many have attempted to manage clinical conditions by using a theoretical approach. A treatment strategy that seems reasonable from an anatomic or physiologic standpoint may not necessarily produce favorable patient outcomes. Improvement is more likely if treatment and management are based on clinical experience or observation rather than theoretical protocols. Ultimately, the best approach will be through the accumulation of data from controlled clinical trials and descriptive case reports. Clinical trials provide more information for the practitioner, because they reveal useful or useless treatment for well-defined circumstances. The case report is important because it provides detailed information about how the patient was treated and monitored. The physiologic mechanisms involved in visceral disorders and how they may be remedied through chiropractic treatment will likely evolve as more basic science information becomes available.

HEALTH CARE TEAM

There are many disorders for which chiropractic treatment alone is not adequate. In these instances, the doctor should know with which health care professional to cooperate. If a spinal subluxation exists, then chiropractic care is indicated, provided no contraindications to treatment are present.

PROBLEM SOLVING

For each disorder there may be a variety of spinal levels which are related. The management approach should be systematic, insofar as the most likely related areas of spinal involvement are adjusted first. Adequate time for the healing process of the particular disorder is mandatory before determining the success or failure of the prescribed treatment. For example, a patient who has accumulated 40 years of dysfunction and degeneration may take years to heal or may not completely recover at all. In these situations, the practitioner must be patient and must realize his or her limitations with respect to the management of spinal related conditions. This perspective towards vis-
ceral management can only be gained through extensive personal clinical experience, and/or by learning from others with such experience. Publication of these clinical observations in scientific journals would ease the dissemi-
nation of this information.

Specificity is critical, because the results of an adjust-
ment are diagnostic. If an unfavorable response is obtained after an adequate trial at a particular level, alternative levels are addressed. Limiting the number of areas initially adjusted at one time allows for a step-by-step approach to problem solving. If a reasonable clinical trial of adjustments at the specified levels has not resulted in a favorable outcome, additional diagnostic work-up is indi-
cated. The general management of a patient with a vis-
ceral concomitant is presented in Figure 13.1.

CHRONIC SYSTEMIC DISORDERS

Gonstead (6) hypothesized that many chronic multifac-
torial diseases (e.g., cancer, migraine headache, osteopo-
rosis, etc.) were related to imbalances of biochemistry from long-term glandular or organ dysfunction (e.g., thy-
roid, adrenal, ovary, liver, kidney, etc.). These chronic conditions usually did not respond until the organ or glandular function had been nearly restored. A minimum of 90 days might be needed to begin to see improvement in the patient’s signs and symptoms. In the early stages of visceral involvement, symptomatic relief may occur within a few weeks. In chronic disorders, postadjustment improvement in the signs and symptoms of visceral dys-
function may suggest a strong spinal component. Local spinal improvement will likely occur before visceral changes in long-standing conditions. Care must be taken to avoid overadjusting these patients.

NEUROVISCERAL ASSOCIATION

The basic principle of chiropractic encompasses the pri-
mary role of the nervous system in the maintenance of homeostasis (health). Homeostasis depends on optimal communication between the brain and the rest of the organ-
ism (7). Nervous system dysfunction may result from a variety of stressors (e.g., genetic, psychological, environmental, mechanical). Optimizing neuromuscular relationships helps the organism to cope with psychological or environmental stressors. In experiments with laboratory animals, it was found that those who underwent a course of manipulation had significantly less stress in response to cold when compared with controls (8–10).

The primary focus of chiropractic care is based on the premise that nervous system dysfunction from vertebral subluxation will interfere with the brain’s regulation of physiology (11). Aberrant somatovisceral reflexes may be caused by spinal dysfunction (12–18). The mechanisms by which the nervous system becomes impaired through changes in the spinal column are diverse (See Chapter 3).

The approach to the management of the patient with a visceral concomitant presented here primarily involves normalization of parasympathetic and sympathetic func-
tion. Abnormal autonomic nervous system activity may be inhibitory or facilitative; however, the relationship between the two divisions is not a simple “balancing act.” The etiology of a particular disease may be associated pri-
marily with one division or the other. Beal (19), in his comprehensive literature review, found that spinal regions were often associated with different organic disturbances. Most of the clinical studies cited correlated well with the anatomic outflows of the autonomic ner-
vous system. Vertebral dysfunction between T1 and L3 affected primarily the sympathetic nervous system. Dis-
orders of the sacroiliac region affected the parasympa-
thetic division, as did the upper cervical region.

Harris and Wagon (20), in their study on the effects of adjustments on autonomic tone (i.e., distal skin tem-
perature), found that different spinal regions had either a sympathetic or nonsympathetic effect. Actual parasympa-
thetic stimulations were not theorized in this study because distal skin temperature is controlled entirely by sympathetic nerve endings. They correlated adjustments to the cervical region (C1-C7) and lower lumbar (i.e., L4-
L5, L5-S1) as having a non-sympathetic effect. Adjust-
ments to spinal segments T1 to L3 produced sympathetic
effects.

Gonstead (6) observed that adjustments of occiput through C5, unfused sacral segments, and the sacroiliac joints (sometimes L5) had primarily a parasympathetic effect, whereas subluxations from C6 through L4 or L5 were associated with sympathetic disturbances.

Sympathetic preganglionic cell bodies are tradition-
ally thought to be confined to the thoracic and upper lum-
bar levels (T1-L3) (7). Our review of the literature has indicated that preganglionic sympathetic cell bodies have been identified at all levels of the spinal cord (21–23). Additional research on the effects of chiropractic adjust-
ments on the autonomic nervous system should be a high priority for the chiropractic profession.

Literature

We have reviewed somatovisceral relationships from a variety of sources (e.g., chiropractic, osteopathic, medi-
cal). Terminology for the spinal lesion is quite diverse. The following represents a partial list of descriptors found in the literature to describe the mechanical joint derange-
ment of the spinal column:

1. Subluxation
2. Osteopathic lesion
3. Dysarthria
4. Somatic dysfunction
5. Vertebral subluxation complex
6. Vertebral subluxation syndrome
7. Bony lesion
When citing reference material, the authors' lexicon may be used. The terms vertebral subluxation complex (VSC) and subluxation will be used most often, because they are germane to the chiropractic profession.

**Nutritional Considerations**

Integral to the management of visceral and other disorders is the implementation of nutritional supplementation to support the healing of tissues affected by the vertebral subluxation complex. Nutritional imbalances affect tissue responses to neural stimuli.

Recent research has revealed that modification of apparently normal diets might produce significant alterations in nutritional, neurologic, endocrine, and behavioral linkages (24). For example, diets that are deficient in the amino acid tryptophan, low in carbohydrates and or high in proteins and fats, tend to produce low levels of both tryptophan and the neurotransmitter serotonin in the brain (25). Low activity of serotonergic neurons is believed to result in a subnormal secretion of the pituitary hormone prolactin and less control of libido. It appears that prolactin reduces the sensitivity of the CNS centers controlling libido in both males and females. Therefore, elevated prolactin will have a dampening effect on both sexual and reproductive functions (26,27). This effect is counteracted by the elevated androgen secretion that occurs in adolescent males and in females who have high androgen secretion from adrenal cortical tissue. The latter effect would be enhanced by low activity of serotonergic neurons and high activity of dopaminergic neurons, because both conditions result in subnormal prolactin secretion (26). Diets related to obesity and the effects of weight gain on the various organ systems are also important to consider in overall patient management.

One might wonder why so much attention has been paid to scientific dietary concerns when it is apparent that the human race has survived for a very long time without the benefits of nutritional science. Numerous anthropologic and epidemiologic studies have shown that human survival apparently depended on the successful adaptation to a wide variety of environments and that those who lacked this physiologic characteristic did not survive. For example, each race appears to have numerous individuals who possess “thrift genes.” This term denotes those who possess the hormonal and other related characteristics that allow them to gain weight rapidly during periods when food is abundant, and the ability to withstand scarcity by drawing on the materials present in their body tissues.

A leading example of these factors at work is the Pima Indians who live in the area between Phoenix Arizona...

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**Figure 13.1.** Algorithm for the chiropractic management of a patient with a visceral concomitant. A, Specialty referral. This includes, emergency room, and primary contact physicians. If the patient is nonambulatory, then appropriate transportation (e.g., ambulance) should be arranged. The chiropractor should work closely with the referral physician because they were the primary contact provider. Many advanced testing equipment (e.g., MRI, CT, bone scan etc.) are available to the primary contact physician to determine which specialty referral is indicated. B, General intake history and comprehensive examination. This includes vital signs and tests of peripheral neurologic function; sensory, motor, reflex, and tests of autonomic function; skin temperature, red response, physical signs of denervation supersensitivity. Is the patient with the concomitant disorder manageable on an outpatient basis? Unstable patients require immediate referral or transportation to a hospital. Contraindications to manual force short lever arm techniques include fracture of the neural arch, infection, and severe osteolytic activity of the contact vertebra. General contraindications include adjustment protocols which would exacerbate the visceral concomitant. For example, a verteobasilar artery incident is likely to be worsened with the administration of subsequent manipulations. C, VSC Present? See Chapter 3 for the parameters related to the vertebral subluxation complex. If the visceral concomitant is probably not related (segmentally) to the VSC then specialty referral is indicated. For example, a patient may have a T4 subluxation but present with cauda equina syndrome. This scenario would dictate immediate referral (neurosurgeon or orthopedic surgeon). D, Adjust most likely responsive subluxation. The subluxation most likely related to the visceral concomitant would be a primary (See Chapter 3) subluxation, which is segmentally associated with the involved viscera. E, Favorable response. There are a number responses which could happen with a patient under chiropractic care. The first involves a reduction in the objective findings of subluxation followed by a resolution of the visceral complaint. This would clearly be the most favorable outcome. Another scenario may show clear reduction in the visceral dysfunction without a concomitant immediate reduction in the visceral disorder. Clinical judgment must dictate the appropriate course in this case. Often, the patient may require sufficient time for healing to occur in order for the resolution of symptomatology to take place. The doctor must weigh the patient's ability to recover with the possibility that additional therapies (e.g., nutritional) are needed or concurrent care with another specialty is indicated. The general well-being of the patient usually dictates their ability to recover. The geriatric with a chronic visceral disorder or someone under extreme psychological stress, will likely take more time to respond than someone with an acute adaptational disturbance. The possibility may exist that reduction of the subluxation related to the presenting visceral complaint may cause a compensation reaction in other portions of the spine. For example, the patient might have a T7 subluxation and stomach pain. Following a course of adjustments to T7, there may be compensation in the lower cervical spine (given preexisting subluxation in the area) which then causes vertebrogenic headache. The doctor may then choose to adjust these other areas, possibly in combination with the initially adjusted region. F, Referral or consultation. Another chiropractic opinion is often warranted when some confusion exists as to the appropriate level of involvement, or appropriate treatment (e.g., adjustment, diet therapy, etc.). Specialists (e.g., internist) with expertise in the disorder being managed are often helpful in patient management, especially when some degree of uncertainty in the diagnosis exists.
and East Central Sonora, Mexico. More than half of the Pimas suffer from adult onset diabetes, and they have over ten times the death rate from diabetic complications as Caucasian Americans (28). When the Pimas return to the use of their traditional diet they lose their excess body weight and most of their adult onset (Type II) diabetic characteristics. Researchers who induced nondiabetic Caucasians in Australia to adopt the Pima diet noted a significant reduction in physiologic risk factors such as the abnormal secretion of insulin in response to dietary sugar. It cannot be assumed, however, that every patient has similar physiologic traits. Therefore, the successful application of nutritional principles to the prevention of degenerative diseases requires that health practitioners identify those individuals most at risk. The urgent necessity for this screening of patients is shown by the fact that five of the ten leading causes of death in the U.S. are thought to be nutritionally related (See Table 13.1).

The gruesome statistics presented in Table 13.1 have led to a consensus by a panel of leading nutritional researchers from universities, medical centers and private industry that certain general recommendations on dietary modifications would benefit most Americans. This advice was compiled by the Nutritional Policy Board of the U.S. Department of Health and Human Services and published in the Surgeon General’s Report on Nutrition and Health in 1988 (29). A brief summary of their recommendations is given in Table 13.2.

The identification of patients with needs for nutritional modifications are most urgent. This identification depends on a thorough screening with proper diagnostic methods. These methods include patient and family histories, physical examinations, dietary assessments, laboratory tests of blood and urine samples, and radiologic examinations.

Very few patients can carry out modifications of their diets without some very explicit descriptions of appropriate food and beverage selection. Examples of corrective dietary plans used by the U.S. Veterans Administration have been provided (See Appendix) (30).

### Table 13.1
<table>
<thead>
<tr>
<th>Rank</th>
<th>Cause of Death</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Heart disease*</td>
<td>759,400</td>
<td>35.7</td>
</tr>
<tr>
<td>2</td>
<td>Cancers*</td>
<td>476,700</td>
<td>22.4</td>
</tr>
<tr>
<td>3</td>
<td>Strokes*</td>
<td>148,700</td>
<td>7.0</td>
</tr>
<tr>
<td>4</td>
<td>Unintentional injuries*</td>
<td>92,500</td>
<td>4.4</td>
</tr>
<tr>
<td>5</td>
<td>Chronic obstructive lung diseases</td>
<td>78,000</td>
<td>3.7</td>
</tr>
<tr>
<td>6</td>
<td>Pneumonia and influenza</td>
<td>68,600</td>
<td>3.2</td>
</tr>
<tr>
<td>7</td>
<td>Diabetes mellitus*</td>
<td>37,800</td>
<td>1.8</td>
</tr>
<tr>
<td>8</td>
<td>Suicide*</td>
<td>29,600</td>
<td>1.4</td>
</tr>
<tr>
<td>9</td>
<td>Chronic liver disease and cirrhosis*</td>
<td>26,000</td>
<td>1.2</td>
</tr>
<tr>
<td>10</td>
<td>Atherosclerosis*</td>
<td>23,100</td>
<td>1.1</td>
</tr>
</tbody>
</table>

*a Causes of death in which diet plays a part.

*b Causes of death in which excessive alcohol consumption plays a part.

### Table 13.2
<table>
<thead>
<tr>
<th>Diet Recommendations</th>
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<tbody>
<tr>
<td>Issues for Most People:</td>
</tr>
<tr>
<td>- Fats and cholesterol: Reduce consumption of fat (especially saturated fat) and cholesterol. Choose foods relatively low in these substances, such as vegetables, fruits, whole grain foods, fish, poultry, lean meats, and low-fat dairy products. Use food preparation methods that add little or no fat.</td>
</tr>
<tr>
<td>- Energy and weight control: Achieve and maintain a desirable body weight. To do so, choose a dietary pattern in which energy (caloric) intake is consistent with energy expenditure. To reduce energy intake, limit consumption of foods relatively high in calories, fats, and sugars, and minimize alcohol consumption. Increase energy expenditure through regular and sustained physical activity.</td>
</tr>
<tr>
<td>- Complex carbohydrates and fiber: Increase consumption of whole grain foods and cereal products, vegetables (including dried beans and peas), and fruits.</td>
</tr>
<tr>
<td>- Sodium: Reduce intake of sodium by choosing foods relatively low in sodium and limiting the amount of salt added in food preparation and at the table.</td>
</tr>
<tr>
<td>- Alcohol: To reduce the risk for chronic disease, take alcohol only in moderation (no more than two drinks a day), if at all. Avoid drinking any alcohol before or while driving, operating machinery, taking medications, or engaging in any other activity requiring judgment. Avoid drinking alcohol while pregnant.</td>
</tr>
</tbody>
</table>

**Other Issues for Some People:**
- Sugars: Those who are particularly vulnerable to dental caries (cavities), especially children, should limit their consumption and frequency of use of foods high in sugars.
- Calcium: Adolescent girls and adult women should increase consumption of foods high in calcium, including low-fat dairy products.
- Iron: Children, adolescents, and women of childbearing age should be sure to consume foods that are good sources of iron, such as lean meats, fish, certain beans, and iron-enriched cereals and whole grain products. This issue is of special concern for low-income families.

### HEADACHE

One of the most common complaints treated by a chiropractor is headache. It is estimated that between 50 and 100 million Americans suffer from chronic headaches each year. Headache sufferers cost businesses more than 50 billion dollars annually in lost labor. Each year 155 million workdays are lost due to headaches (31).

A thorough history is necessary to ascertain etiologic factors. The subjective findings are one of the most important clues in determining associated spinal levels of involvement. The headache may be described as sharp, dull, throbbing, stabbing, band-like, vise-like, or thumping. Temporal characteristics (e.g., morning, evening, postexercise, postprandial, etc.) should be determined. Headaches occurring later in the day and aggravated by stress may indicate muscular tension involvement. Those that are present on awakening may be associated with imbalances of body chemistry (e.g., hypothyroidism) (6), a strained sleeping position, or previous alcohol ingestion.

Associated symptoms with the headache can provide information as to the etiology. Patients with headaches associated with hypothyroidism will also have symptoms of that disorder; weight gain, intolerance to cold, persistent cough, etc. An aura or visual scotoma before a unilateral headache is commonly associated with classical
migraine. Bilateral tinnitus is suggestive of a hypertensive etiology. A fever with neck pain on forced flexion may indicate an infection, such as spinal meningitis.

A common cause of headache is ingestion of alcohol which irritates the brain directly and lack of (or too much) sleep. More than one type of headache may be present with a given patient, making management more challenging. We present some of the more common headaches encountered in practice which may be ameliorated with chiropractic treatment. Some types of headaches have multifactorial etiologies. A reduction in symptomatology in these cases may not immediately follow improvement in the related biomechanical dysfunction.

**Tension or Stress Headaches**

Sustained contraction of the neck and shoulder muscles is a common cause of extracranial headache and is termed muscle tension or muscle contraction headache (MCH). This kind of headache is often initiated or exacerbated by stress and relieved by rest, analgesics, and movements that relax neck musculature. MCH is commonly described as a dull, pulling, ache manifesting itself in the region of the upper cervical musculature. The MCH commonly travels from the suboccipital area to the frontal region. The intensity is usually mild to moderate. The timing is towards the end of the day, although it is not uncommon for a MCH to last more than one day.

An anterior carriage of the cranium leads to sustained muscular contraction to keep the head upright (32) (Figure 13.2). Subluxations that cause or contribute to retraction or reversal of the cervical lordosis are often involved.

Spinal lesions contributing to MCH can range from the mid dorsal spine to the lower cervical region. Close attention should be directed to the cervicothoracic junction (C6 to T3) (33). Subluxations in the pelvic region, such as an ASI ilium or a severely rotated sacrum may at times lead to compensatory hypolordosis of the spinal curvatures and should be considered in the overall management. All of the sagittal curves are interdependent. Adjusting a midthoracic subluxation in combination with a lower cervical or upper thoracic subluxation, is often indicated.

**Suboccipital Headache**

Suboccipital headache is described as a focal area of pain in the suboccipital region which may be caused by irritation of the cervical nerves (34). Sustained muscular contraction from loss of the normal cervical lordosis appears to be a common denominator. Cervicothoracic subluxations (C6-T3) should be ruled out. Hypermobility of the upper cervical articulations in compensation for fixation dysfunction below may also be an important etiology. Occasionally, an upper cervical subluxation is involved (6). It is often difficult to differentiate between a suboccipital and muscle contraction headache.

**Vascular Headaches**

These headaches are characterized by a throbbing, pulsating pain, usually behind one eye, and sometimes accompanied with unilateral frontal radiation. The pain is rarely severe; however, sleep disturbance may occur. This type of headache is not relieved by analgesics. Over-ingestion of analgesics is common as patients receive little relief from them. Nausea and vomiting often results from such overingestion and should not be confused with a somatovisceral disorder. The patient often complains that “nothing seems to help.” Vascular headaches include migraine (classical and common), and headaches with a hypertensive etiology.

In elderly patients with headache, especially of recent onset involving the temporal region, one must always consider the possibility of temporal arteritis. Associated symptoms may include transient visual disturbances, malaise, fever and muscular aches, particularly involving the muscles of mastication. Corticosteroid therapy is considered effective in lowering the incidence of blindness, a complication which can occur in some patients.

**CLASSICAL MIGRAINE**

The migraine headache is a disorder characterized by recurrent attacks of headache with variable intensity, frequency, and duration. Migraines are commonly associated with nausea, vomiting, and anorexia and are often accompanied by neurologic and mood disturbances (35).

Classical migraine headache is the type that is preceded or accompanied by transient focal neurologic phenomena; visual aura of scintillating scotomas, fortification spectra, sensory disturbances such as paresthesia, and/or motor disturbances. It is commonly thought of as a central nervous system disturbance. There is also evidence that muscle contraction (tension or stress) headache can eventually lead to migraine (36). The various, sometimes arbitrary, classifications of headache appear to mingle as one studies the subject in detail (37). Vernon (38) has reviewed the literature on headaches that appear to have their origin in the cervical spine. Cervical spine causes of migraine and other types of headaches have
been largely ignored by mainstream medical management. He presents two headache patients who responded favorably to chiropractic manipulation.

Classical migraine affects 10 to 30% of all migraine sufferers (37). Wight (35) showed a success rate of 75% in migraine patients treated with chiropractic methods. Parker et al. (39) demonstrated a 47% success rate in patients treated with manipulation (seven chiropractic treatments over a 2-month period) after a 2-year follow-up. Subluxations of the cervicothoracic junction (C6 to T4) and the thoracolumbar area (T12-L3) (6,33) may be associated with migraine headache.

Please see the dietary modification guidelines at the end of this section for adjunctive considerations for the rare patient who is unresponsive to adjutivtreatment alone.

COMMON MIGRAINE

In contrast to the classical variant, common migraine headaches do not display sharply defined neurologic disturbances. They might only present with nausea in conjunction with the headache. The various symptomatology is more reflective of a peripheral nervous system disturbance. As in classical migraine, the cervicothoracic junction and the thoracolumbar region should be ruled out for subluxation complexes. In some individuals prone to migraine, adjustments of the upper cervical region may provoke an attack (6). There are instances in which cervical subluxations can cause various headache syndromes (38).

Dietary Considerations. Patients whose headaches are triggered by certain vasoactive dietary substances may wish to eliminate those foods from their diets during the early phases of chiropractic treatment. Approximately one-third of migraine headache sufferers will benefit from dietary modifications (40). The following is a list of foods to be avoided that was compiled by Theisler (31) for use in the management of the headache patient:

2. Chocolate, cocoa, white chocolate, licorice.
3. Nuts, especially peanuts, peanut butter, pumpkin, sesame, and sunflower seeds.
4. Avocados, papaya, red plums, fresh pineapple, raisins, canned figs, banana (limit to one-half banana per day).
5. Milk, eggs, sour cream, yogurt, butter milk, and all dairy products.
6. Hot fresh breads, raised coffee cakes, and donuts.
7. Corn, tomatoes, olives, pickles, sauerkraut, onions (except for seasoning).
8. Broad beans, lima beans, navy beans, pea pods, pinto beans, soy beans, and snow peas.
9. Aged or cured meats: hot dogs, ham, bacon, bologna, chicken liver, pork; fermented sausage: salami, pepperoni.
10. Soy sauce, yeast, yeast extract, brewers yeast, Accent Seasoned salt (monosodium glutamate), meat tenderizer.
11. Citrus fruits: oranges, grapefruit, lemons, limes (limit to one half cup serving per day).
13. Foods containing large amounts of monosodium glutamate (e.g., Chinese).
15. Vinegar (except white vinegar).
17. Wheat products.
18. Anything fermented, pickled, or marinated.
19. All alcoholic beverages. If you must drink, do not exceed more than two normal sized drinks. Suggested drinks: Haute Sauterne, Riesling, Seagram's VO, Cutty Sark, vodka.
20. Shellfish.

HYPERTENSIVE HEADACHE

Hypertensive headache is characterized as a mild to moderate, generalized, throbbing pain of the occipital or vertex region of the head. The pain can be unilateral, and there may be an associated muscle contraction headache (37). Dizziness is often present, especially during motion of the head and neck.

Generally, the blood pressure must be elevated to above 200/120 mm Hg to cause this type of headache (37). The pain is alleviated by rest and antihypertensive drugs and aggravated by chemicals that increase blood pressure, such as caffeine or nicotine. Refer to the section on hypertension for appropriate chiropractic management.

Cluster Headache

Cluster headaches usually begin to appear in patients in their late teens or early twenties. They occur more commonly in males and are rare beyond the age of 40 (41). The pain comes in clusters, recurring as often as two or three times a day with intervals of asymptomatic times that last two or three weeks before the pain begins again. There may be associated unilateral tearing. The headache is constant and severe (knife-like) and lasts 30 to 45 minutes. There is no associated nausea or vomiting as in migrainous type headaches. Cluster headaches are correlated with HLA antigens, low serotonin levels in the brain, and there seem to be trigeminal nerve interactions as well (42). Because of possible trigeminal nerve involvement, spinal subluxations of the upper cervical region should be ruled out.

Chemistry Headache

The chemistry headache is a deep and generalized headache that is often alleviated by exercise. The intensity can vary from mild to severe. It is commonly seen after a
change in activity level or extended sleep (e.g., patient awakens with it on a Saturday morning after sleeping in) (6). Spinal lesions should be ruled out from C6 to T4 (33), but all levels need to be analyzed for the presence of a VSC.

Digestive Headache

Digestive headaches generally present after eating. Postprandial hypoglycemia should be ruled out. If the pain occurs within an hour of eating, the upper cervical region, especially C1-C2, could be contributory. Headaches that begin one-and-a-half to two hours after eating may be caused by dysfunction in regions with sympathetic outflows to the alimentary tract (T4-L3) (6).

Sinus Headache

The sinus headache is associated with inflammation, congestion, or infection of the sinuses. This generally mild pain may become quite severe during weather changes that affect humidity or barometric pressure (33). The headache is described as dull or gnawing and is located directly over the frontal or maxillary sinuses. They often begin in the morning and worsen as the day goes on. The upper cervical region (C0-C5), especially atlas or axis (6) should be checked for subluxation. A deviated nasal septum may be contributory (See Chapter 15) as well as drug use (e.g., cocaine).

Headaches of Temporomandibular Origin

Headache caused by temporomandibular joint (TMJ) dysfunction is usually described as a steady, dull pain radiating from the TMJ posteriorly to the temporal area (33). There may also be radiation towards the nasal region (6). It is caused by mechanical irritation of the nerves innervating and surrounding the temporomandibular joint. The pain can range from mild to severe depending on the extent of articular dysfunction. The headache is aggravated with movement of the joint. Refer to Chapter 15 for management of TMJ dysfunction.

Post Whiplash Headache

Headaches are one of the most common sequelae of acceleration/deceleration injuries of the head and neck. These chronic, recurrent headaches can manifest themselves usually minutes and sometimes days after the initial trauma. The patient does not present with persistent focal neurologic signs as in migraine. The headache can be caused by cerebral concussion and/or irritation of the cervical nerves. Posttraumatic headache is often accompanied by symptoms of dizziness, difficulty in concentration, nervousness, personality changes, and insomnia (43). Appropriate spinal management of the spinal injury usually resolves the complaint (See Chapter 10).

Headache and Vertebral Basilar Artery Insufficiency

One of the most important headaches the chiropractor must consider is that associated with vertebral basilar artery insufficiency (VBAI). This must be considered in the differential diagnosis of head pain especially when the onset is sudden and intense. Additional rotational manipulations appear to accentuate the trauma, if they compromise previously damaged vascular structures. All adjutative procedures of the cervical spine must be carefully performed. Attention should be given to placement of the cervical spine in a neutral position during the adjustment. The extremes of extension, flexion, lateral bending and especially axial rotation will compromise the vertebral arteries.

Although the occurrence of basilar artery ischemia after manipulation is rare (about 1 death in 181 million manipulations) (44,45), there are many techniques that avoid the dangerous axial rotation and extension movements which usually precipitate the event. Symptoms associated with VBAI include, headache, nausea, vomiting, nystagmus, vertigo, suboccipital tenderness, and “drop attacks” (instantaneous and temporary quadriplegia on rotation and extension of the neck) (11).

Eyestrain Headache

Eyestrain headaches are typically precipitated with reading. Described as a mild to moderate ache that often becomes sharp, the pain may radiate from the orbit to the occiput and is commonly bilateral. Optometric consultation is indicated if the symptoms persist after chiropractic treatment.

GYNECOLOGIC DISORDERS

Research in the area of female disorders is plentiful although exact etiologies for many processes (e.g., dysmenorrhea) are unknown. Because of the paucity of clinical trials, many patients suffer from mismanagement by health professionals. This may be due to a reflection of the widespread belief that many of these disorders are benign and do not require a comprehensive management strategy. The patient suffering from any of the conditions which follow will think that the condition is anything but benign. The approach of the chiropractor is that painful menses is not normal despite its widespread occurrence. Successful treatment of these disorders has been reported by many chiropractors (46,47). It is important to differentiate a purely mechanical etiology from one that is hormonal (6).

Mechanical Etiology

Pelvic obliquity or torsion and its related ligamentous (e.g., broad) distortions may result in tipping of the
uterus. This mechanical alteration can interfere with the normal flow of menstruation or lead to difficulties in childbirth.

Chiropractic care is aimed at the reduction of any subluxations in areas that cause pelvic torsion or alterations of the normal lumbar lordosis and sacral base angle. The mechanical effects of this treatment are thought to result from changes in the angle of contraction of the related muscle groups or via normalization of muscle tone through neurologic mechanisms.

Endocrinologic Etiology

The widespread allopathic use of oral contraceptives to modulate the menstrual cycle illustrates the importance of controlling hormonal levels in managing patients with female related disorders. Dysfunction of the ovaries, thyroid and adrenal glands may be verterogenic (See Endocrinologic Disorders). Hypothyroidism (48,49) and adrenal dysfunction (49) may be related to ovarian dysfunction.

The sympathetic fibers arising from the tenth and eleventh thoracic spinal cord segments innervate the ovaries and fallopian tubes. The parasympathetic supply is from the hypogastric plexus (vagus). Autonomic control is primarily vasomotor. Clinical management of these disorders may extend beyond the local anatomic innervation of the ovaries.

The symptoms associated with hormonal imbalances are more diverse and complex than those related to mechanical etiologies. These symptoms may range from premenstrual syndrome to amenorrhea.

The focus of chiropractic care is on normalizing endocrine function through autonomic nervous system effects by correcting vertebral subluxations related to specific end organs or tissues. A favorable response to treatment may be delayed from 60 to 90 days in these patients because of the time required in healing of glandular tissue (6).

DYSMENORRHEA

Primary or functional dysmenorrhea is cyclic pain associated with menses during ovulatory cycles but without demonstrable lesions (e.g., endometriosis) affecting the reproductive cycle. Its etiology is thought to result from uterine contractions and ischemia, the passage of tissue through the cervix, a narrow cervical os, or malposition of the uterus. Signs and symptoms include low abdominal pain (cramping, dull ache often with radiation to the low back or legs), endometrial casts or clots, urinary frequency, nausea, diarrhea, pelvic soreness, and headache.

Secondary dysmenorrhea is pain with menses caused by demonstrable pathology. Endometriosis, chronic pelvic inflammatory disease, adhesions, fibroids and polyps have all been implicated as possible etiologies.

The specific location and timing of cramping or pain assists in the differentiation of a mechanical from a hormonal etiology. Pain related to a mechanical problem is usually located in the lower anterior pelvis and coincides with the onset of menses. The pain may intensify after the start of flow. This structural dysfunction may be attributed to a loss of the normal lumbar lordosis. Subluxations that can reduce the lumbar curve include an ASI ilium, rotated sacrum and severely rotated lumbar vertebrae. Other subluxations (e.g., PFl ilium, Base Posterior Sacrum) may also be contributory.

Dysmenorrhea from hormonal dysfunction will generally present as abdominal pain and cramping beginning a few days before the onset of menstruation. Because of the generalized hormonal imbalance, other related symptoms may also be present (e.g., premenstrual syndrome). The primary levels of involvement are usually the upper lumbar spine (e.g., L1-L2) but can range from T12 to L5. The mechanisms involved are unclear but compensatory hypermobility in the lower thoracic spine may be a possible mechanism for initiation of nervous system dysfunction. In premenstrual syndrome, hypothyroidism may be a concomitant, therefore, the cervico-thoracic junction (C6-T3) should not be overlooked (6).

AMENORRHEA

Amenorrhea occurs physiologically before menarche, during pregnancy and early lactation, and after the menopause. Primary amenorrhea is defined as a delayed onset of menarche (age 18 years). The cessation of menses due to nonpathologic causes in a previously menstruating woman is termed secondary amenorrhea. Oligomenorrhea is characterized by infrequent menstruation in which the interval between cycles can range from 40 to 90 days (49).

Amenorrhea results from a disturbance in the production of estrogen and progesterone by the ovaries. Vertebrogenic amenorrhea is usually related to spinal dysfunction in the lower thoracic area to the lower lumbar region. The upper lumbar region (e.g., L1-L2) appears to be a common site for dysfunction in these patients (6).

Some cases of this disorder result from elevations in prolactin secretion. Stress, vigorous and frequent physical activity and tumors of the secreting cells of the pituitary can elevate blood concentrations of prolactin. High levels of serum prolactin inhibit the secretion and actions of the pituitary gonadotropins follicle-stimulating hormone (FSH) and luteinizing hormone (LH). The amenorrhea test panel for patients is serum levels of prolactin, FSH, and LH.

FIBROCYSTIC DISEASE

Fibrocystic disorders are the most common disease of the female breast (49). Hormonal imbalances are considered
to be a fundamental etiology. An increase in estrogen and a decrease in progesterone levels are often detected. This could be the reason why there tends to be a lower incidence with oral contraceptive use. Gynecologic consultation is indicated because these patients are more likely to develop carcinoma of the breast. The dominant variant of fibrocystic disease that is associated with an increase risk of breast carcinoma is ductal and lobular epithelial hyperplasia. The cysts may become more noticeable with approaching menses. Chiropractic examination and treatment of patients with fibrocystic breasts should include all indicated spinal levels with concentration primarily on the upper lumbar spine (6).

**MENOPAUSE**

Menopause normally occurs without side-effects. Hot flashes may be associated with ovarian/hormone dysfunction. The upper lumbar and the lower thoracic region should be examined closely because subluxations in these regions may be related (6).

**MISCARRIAGE**

Miscarriage can be caused by a variety of structural (e.g., uterus) or physiologic (e.g., hormonal) etiologies. Normal function of the nervous system is of paramount importance in sustaining a pregnancy. Miscarriages that occur early on in the pregnancy usually are related to hormonal dysfunction. The upper lumbar spine, therefore, should be checked closely. Hypomobility in the upper lumbar spine may cause compensatory hypermobility in the lower thoracic area, thus possibly eliciting aberrant somato-visceral reflexes. Late pregnancy abortion may be associated with a tipped uterus. The pelvic region and subluxations that can cause reduction of the normal lumbar lordosis (e.g., ASI n, rotated sacrum) may be related (6).

**INFERTILITY**

In the infertile female with normal ovulation, an examination of the spinal column is in order. Subluxations that influence the lumbar lordosis or affect ovarian hormone function should be ruled out. It is estimated that approximately 40% of infertility etiologies involve the male (50). Consultation with a specialist is indicated. Many drugs, such as corticosteroids, can affect fertility in the male.

**HEART DISEASE**

Diseases of the cardiovascular system are the most common causes of death for developed nations. Nutritional (e.g., cholesterol) and environmental (e.g., smoking) risk factors are commonly associated with these disorders. The contribution of the chiropractic profession in preventing and managing cardiovascular dysfunction is largely unexplored.

The efferent sympathetic preganglionic nerve fibers to the heart arise from the thoracic levels T1-T5. The upper segments supply the ascending aorta, pulmonary trunk and ventricles. The lower segments innervate the atria (7). The parasympathetic fibers to the heart are derived from cells near the nucleus ambiguous and the dorsal nucleus of the vagus. These nerves run in the cardiac branches of the vagus and synapse in the cardiac plexus and in the walls of the atria (7). The parasympathetic nerves slow the rate of the heart and cause constriction of the coronary arteries. Adjustments to the upper cervical region should be avoided in a patient with myocardial infarction or coronary artery spasm.

Sympathetic stimulation raises the heart rate and causes vasodilation. Nerve terminals storing norepinephrine are found in the sinoatrial and atroventricular nodes, the atrial and ventricular myocardium, and the Perkinje system.

The heart apparently manufactures much of the norepinephrine that it needs and in this way can be thought of as an endocrine gland as well. Tissue concentrations of norepinephrine are reported to be lower during heart failure (51). Prolonged electrical stimulation of the norepinephrine discharging cardiac sympathetic nerves has been shown to elicit electrocardiographic signs of hypoxic myocardial damage and subendocardial hemorrhages and necrosis (52).

The parasympathetic nervous system also has a role in optimal cardiac function. Hall (53) showed that damage to the myocardium and coronary artery could be produced through daily administration of acetylcholine in experimental unanesthetized dogs. Continual stimulation of the vagus also has been linked to microscopic changes in the heart, including early hyaline degeneration of the myocardium (54).

Angina pectoris and myocardial infarction have both been associated with coronary thrombosis. There are reports, however, of patients with diagnosed angina pectoris or myocardial infarction who have normal coronary arteries as demonstrated with coronary arteriograms (55–59). This incidence may be as high as 30% of patients who are referred for cardiac catheterization (60). Rogers (61) cites two cases in which coronary artery spasm led to the patient’s symptomatology and hypothesizes that there is a role for manipulative therapy, through normalization of autonomic function, in the management of coronary artery spasm in the absence of demonstrable thrombosis. Angina from dysfunction of the cervical spine (e.g., disc lesion) may be a more common occurrence than previously thought (62,63). Many of these patients will respond to nitroglycerin therapy, however, thus adding more confusion to the picture. Other reports (64–68) have described an association between mechanical lesions in the spine and angina pectoris. Burns (69) reports normalization of heart function after correction of lesions of the third thoracic vertebra in laboratory animals. She cites
previous literature (70) indicating pathologic cardiac effects following the production of spinal lesions in laboratory animals. A report by Rogers (71) showed that spinal manipulative therapy was capable of normalizing the autonomic nervous system tone and being of benefit in nine patients with congestive heart failure.

In a study of 150 patients with heart disease, Koch (72) found that 92% of organic cardiac cases showed radiographic and palpatory evidence of soft tissue aberrations in the area of T2-T6. Many of the patients reported symptoms of musculoskeletal dysfunction just preceding and sometimes months before the initial cardiac distress. It is interesting to note that many presentations of myocardial infarction (MI) occur after primarily nondemanding activities, such as lawn mowing, washing, ironing, and not general body or leg activity, which would place the most demand on the cardiovascular system (73). There is a high incidence of heart disease among manual laborers. Upper extremity tasks do put a higher stress on the cervico-thoracic junction possibly explaining the occurrence. More research is needed in this area to clearly define the role of spinal manipulation in the management of heart disease.

Manipulative therapy has been shown (74) to normalize vasomotor tone through autonomic reflexes. Figar (75), using pre- and postphlebysmography, has shown that normalization of distal skin temperature occurs after cervical manipulation. Harris and Wagnon (20) have documented changes in distal skin temperature that corresponded to autonomic outflows after chiropractic adjustments.

Results of a blinded study by Beal (76) to test the occurrence of somatic dysfunction in patients with cardiovascular disease indicated a peak incidence of spinal lesions at the T2-T3 level. When the palpatory findings in the thoracic region were of a high magnitude, they were commonly associated with somatic dysfunction in the cervical spine as well. In an attempt to identify a link between palpatory findings (warm temperature, ropiness, increased density, edema, etc.) with the anatomic locus of acute myocardial infarction, Rosero (77) correlated anterior wall myocardial infarction and palpatory clues of increased warmth and resistance to mobility of the segments in question.

Nicholas (78,79) reports on a blinded, randomized investigation of somatic dysfunction in patients with myocardial infarction. Qualitative palpatory findings (increased firmness, warmth, ropiness, edema, heavy musculature) were significantly associated with the upper thoracic segments T1-T4. One of the authors’ conclusions was that the palpatory examination is important in identifying those patients with a myocardial infarction and is of help in predicting those cases that may develop an MI. A double blind study by Cox (80) correlated palpable musculoskeletal findings with coronary artery disease. They found a peak incidence at the fourth thoracic segment. Musculoskeletal examination was concluded as being a helpful supplement but not a substitute for standard methods in the diagnosis of coronary artery disease. Further investigation in this area is clearly indicated due to the high morbidity and mortality associated with heart disease.

Osteophytes of the spine which compress the sympathetic trunk may be a source of autonomic disturbance in some individuals (81). The incidence of osteophytic lipping of the thoracic spine and coronary heart disease has been investigated by Cox (82). Ninety-two patients underwent a blinded review of lateral radiographs. The results indicated that 43% of patients with significant coronary stenosis had thoracic osteophytes. A control group was found to have an incidence rate of only 15%. It was concluded that the presence of thoracic osteophytes was a good predictor (85%) (See Chapter 4) of coronary atherosclerosis but was not sensitive.

Lewit (83) states that restricted mobility of the upper thoracic spine is a possible risk factor in organic heart disease. He suggests that there is a role for manipulative treatment, especially in the case of paroxysmal tachycardia, but gives no data on results of treatment. Freedman (84) reports a patient with diagnosed premature ventricular contractions, which normalized after chiropractic adjustments. Miller (85) reports an investigation in which subjective improvement in patients with chronic obstructive pulmonary disease was noted after manipulative treatment.

Bradydysrhythmias and Tachycardia

Bradydysrhythmias can be caused by excessive parasympathetic activity. Gonstead (6) hypothesized that this was due to a subluxation in the sympathetic region (T1-T4) which caused a relative parasympathetic override. On a rare occasion, the upper cervical region may be a factor. Tachycardia was most often correlated with upper cervical subluxation (6).

HYPERTENSION

Approximately 90% of hypertensive cases have an unknown etiology (86). This type of hypertension is termed essential or primary. Secondary hypertension (10% of cases) is due to renal (e.g., pheochromocytoma), endocrine (e.g., pituitary tumor), and other mechanisms. A diagnosis of hypertension is not made, generally, unless the elevated pressure is present on at least two separate occasions. The classifications of hypertension are as follows (87):

**Diastolic:**

- BP < 85
- BP = 85–89
- BP = 90–104
- BP = 105–114
- BP > 115

**Normal**

- High-normal
- Mild
- Moderate
- Severe

**Systolic:**

- BP < 140
- BP = 140–159
- BP = 160–199
- BP > 200

**Normal**

- Borderline
- Systolic Hypertension
HYPERTENSION

The hypothalamic and medullary regions of the brain control blood pressure. From these centers, parasympathetic and sympathetic influences exert regulatory control over the major effector organs; the heart, kidneys, and peripheral vascular components (88). The sympathetic nervous system (SNS) controls the increase of cardiac output by vasoconstriction of the peripheral vasculature to divert more blood to muscle and nervous tissue. The overall effect is an increase in the systemic blood pressure. The parasympathetic nervous system decreases blood pressure and cardiac output and increases the activity of the digestive system. Both systems are continually firing at a baseline rate, thus providing an equalizing vasomotor tone (88).

A review by Crawford et al. (88) identified the upper cervical region (C0-C2), the upper thoracics (T1-T6), and the lower thoracics (T11-T12), as potential sites for somatic dysfunction in patients with hypertensive disease. Gonstead (6) classified management of high blood pressure into three categories; diastolic, systolic, and mixed.

General Considerations

It is important to understand when referral to a medical specialty (e.g., internist) is indicated for patients with hypertensive disease. If the patient is younger, with only mild hypertension, there is less of an indication for immediate referral. The older patient, especially one without hypertensive medication, should be observed carefully. If positive results are not seen in a few treatments then referral is suggested. The long-term effects of chronic hypertensive disease can be severe. The kidneys are especially vulnerable. Proteinuria from kidney malfunction is easily detected with urinalysis.

A sudden increase in blood pressure can be dangerous. In this patient, the vessel walls have less time to compensate for the disease and an immediate referral for pharmacologic assistance is indicated. The patient should be managed with chiropractic after initial reduction of the pressure with hypertensive medication. Patients who experience a sudden increase in blood pressure should be examined for the presence of an upper cervical subluxation (6). Adjustments in this area should be of a specific nontarget nature (See Chapter 11).

Monitoring the blood pressure is critical to patient management. It should be measured before and after each adjustment. The patient who is on hypertensive medication may experience low blood pressure after the treatment because of the combined effects of the medication and the adjustment. The chiropractor should work in conjunction with a medical specialist, so that the medication can be diminished should the patient respond to treatment. A rapid drop in pressure in a patient with chronic hypertensive disease may indicate myocardial infarction. Immediate referral to a hospital emergency room is mandated in this situation.

Dietary and lifestyle changes for the hypertensive patients should be considered in their overall management. Excellent sources are available for this information (89).

DIASTOLIC HYPERTENSION

Gonstead (6) found that patients suffering from diastolic hypertension had subluxations of the upper cervical region (C0-C5), especially atlas-axis. A low blood pressure during the morning which gradually elevates towards the end of the day was also related to this area of the spinal column.

SYSTOLIC HYPERTENSION

Gonstead (6) observed subluxations in systolic hypertensive patients primarily at the cervicothoracic junction (C7-T3) and the thoracolumbar areas (T10-L2). The splanchnic nerves terminate to form the renal plexus which influences blood volume and flow pressures through the kidneys (88). In a study using laboratory animals, Sato and Swenson (90) concluded that sympathetic stimulation of the lower thoracic segments resulted in a lowering of blood pressure. The influence of the autonomic nervous system on adrenal and renal function is thought to be the mechanism involved in many patients with hypertension (89).

MIXED HYPERTENSION

Those patients who have both a high systolic and diastolic blood pressure are more challenging in terms of management. Usually the lower thoracics are involved (T10-T12). If an upper cervical subluxation is present, it should be monitored only initially. Thoracic subluxations should be reduced (about a month) before moving to the upper cervical region (6). In some instances, the upper cervical area will need to be corrected. Those percentages and characteristics of patients who fall into this category is presently unknown. Close monitoring of the blood pressure after each adjustment will help in determining which levels are likely involved.

HYPOTENSION

Hypotension, or low blood pressure, may present in a variety of ways. One common presentation of the disorder is the orthostatic variant. Orthostatic hypotension is the abrupt decrease in blood pressure manifested on assuming an erect position. These individuals usually maintain a relatively normal blood pressure accompanied by sudden orthostatic decreases. Autonomic (primarily
sympathetic) nervous system mechanisms normally compensate for the pooling of blood in the veins that results from arising to the erect position. The baroreceptors of the aortic and carotid sinus areas initiate reflexes resulting in sympathetic discharge. The sympathetic stimulation produces increased vasomotor tone and cardiac output and the restoration of blood pressure. The symptoms of orthostatic hypotension are usually mild and include lightheadedness and mental blurring but may even produce syncope and generalized seizures. These symptoms are transient and directly related to the change in posture to an erect position.

Orthostatic hypotension commonly results from the interference of the above autonomic nervous system reflexes by drugs such as antihypertensive medication, monamine oxidase inhibitors used in mental and nervous disorders, barbiturates, and alcohol. Reductions in intravascular volume from hemorrhage, vomiting, diarrhea, and sweating may lead to dehydration and orthostatic hypotension. Various neuropathic diseases have also been associated with this disorder.

An individual who maintains a relatively low blood pressure at all times may experience symptoms related to orthostatic hypotension as well as generalized fatigue, low resistance to illness, and low tolerances to stress. These concomitant symptoms may result from associated disorders that may be causing the low blood pressure. Hypotensive individuals are commonly overlooked by physicians unfamiliar with the disorder or written off as subclinical or normal variants. The astute clinician, aware of the possible causes and management of hypotension, may provide much needed aid to these patients.

The successful management of these patients requires correction of the cause of the hypotension. The most common causes of ongoing hypotension are hypothyroidism, adrenocortical insufficiency, and anemia. Mild and easily overlooked manifestations of these conditions may contribute to low blood pressure. The assessment of the underlying cause(s) of hypotension includes a differential diagnosis of the above three disorders. A complete history, physical examination, and blood laboratory panel is requisite to accurately assess the possible causes of hypotension. Findings within the normal ranges for blood values may not completely rule out the possibility of abnormal internal function. Normal blood values are relatively wide ranges, and it is not unusual for patients to manifest symptoms and signs of a disorder in the presence of “normal” blood values. Laboratory results are subject to error and may need repeating to ensure accuracy.

Anemia

The history may reveal the most likely cause of hypotension and thereby direct the chiropractor to streamline the differential assessment and design a treatment trial that is practical for the patient. A past history of anemia is a strong clue to the probable cause of a presenting case of hypotension. The heart rate may help to differentiate between anemia and hypothyroid or hypoadrenia. With hypotension, one may expect an elevated heart rate if anemia is associated. Hypothyroid patients, however, will usually have a decreased heart rate. Blood laboratory analysis should confirm or refute an anemic condition causing the hypotension. Disorders that cause decreased red cell production or increased red cell destruction must be differentially assessed. Subclinical manifestations of anemia may be managed chiropractically and may be related to nutritional factors such as dietary lack of essential vitamins and iron, or malabsorption due to chronic gastrointestinal disorders. If Vitamin B12 deficiency is suspected, either due to dietary deficiency or malabsorption, a clinical trial of sublingual B12 may be indicated. If malabsorption is suspected, chiropractic assessment for a VSC and a possible somatovisceral relationship is indicated. The middle thoracic to upper lumbar areas are the most likely related areas of involvement; however, no area of the spine should be overlooked.

Adrenocortical Insufficiency

A pre- and poststress blood pressure test may reveal adrenal involvement. Take the blood pressure, and then have the patient hop on one leg 20 times and then the other leg 20 times. Take the blood pressure again. If the systolic pressure does not elevate by at least 20 points, adrenal insufficiency or hypofunction should be suspected. In the absence of the need for medical referral (neoplasm, inflammatory necrosis of the adrenal cortex, etc.), the patient should be managed chiropractically with consultation as to the possibility of stress reduction (a potential cause of adrenal insufficiency) and management of the related spinal areas, principally from T8 to T12. Nutritional support should also be considered (See Hypoadrenalism).

Hypothyroidism

A low functioning thyroid may be a more common cause of hypotension than is traditionally believed. The hypotension may be the result of bradycardia secondary to hypothyroid function (See Hypothyroidism). Concomitant findings associated with hypothyroidism include lethargy, weight gain, intolerance to cold, and dryness of the skin.

RESPIRATORY DISEASE

Infection

Manipulative therapy in the treatment of upper respiratory infections in children has been investigated by Purse
(91). In 4,500 cases of infection, there were 780 instances of complications ranging from simple conjunctivitis and acute otitis media to acute bronchitis and bronchial pneumonia. Upper cervical spinal motion restrictions were associated with acute otitis media. If spinal motion could be maintained or reestablished, complications rarely developed. The results of this study indicated manipulative therapy to be a superior treatment to antimicrobial therapy and that pharmacologic therapy is not indicated unless complications develop.

Other reports by osteopaths (92,93) have advocated a manipulative approach for the treatment of pneumonia. Treatments included mobilization of the cervical and thoracic spine as well as soft tissue manipulation of the paraspinal tissues. In addition, the thoracic pump, a manipulative maneuver designed to increase lymph flow in the region, is thought to be of help (94). In this treatment, the physician applies a pressure over the caudal or cephalad portion of the rib cage in an effort to increase the amount of tidal volume (95). Some authors have advocated an approach that emphasizes specific manipulation at fixed spinal levels and not manipulation applied in some general fashion (96).

Kline (97), in an investigation of combination treatments for respiratory infections, concluded that manipulative therapy in combination with antimicrobial agents was superior to manipulation alone. This study involved 252 patients and included conditions such as pneumonia, tracheobronchitis, tonsillitis, influenza, nasopharyngitis and general upper respiratory infections.

Somatic dysfunction associated with pulmonary disease appears to have a predilection for the segments T1 to T7 and in the upper cervical spine especially at the C2/C3 articulation (98). A report by Beal and Morlock (99) indicated a peak incidence of somatic dysfunction between the T2 and T7 motion segments. Nicholas (100) reports an incidence at T5 bilaterally in 60% of patients with respiratory dysfunction. Fifty percent of the patients demonstrated lower cervical involvement (C4-C7). A review of the literature by Beal (19) has indicated that somatic dysfunction in patients with lung disease occurs primarily at vertebral segments T3 to T5.

Asthma

The lungs are innervated by the pulmonary plexuses. The plexuses are formed by branches from the vagus and efferent sympathetic nerves that arise from the thoracic segments T2 to T5. The efferent vagal fibers are secretomotor to the mucous bronchial glands, and are vasodilator and bronchioconstrictive. When the efferent sympathetic fibers are activated, bronchodilation and vasoconstriction occurs.

There appear to be distinct autonomic abnormalities in asthma. Prolonged sympathetic stimulation in laboratory animals has been shown to decrease lung compliance by 38% (101). This occurs in the absence of gross pulmonary congestion and edema. Excessive mucous secretion and bronchial mucosal edema found in asthma patients are further evidence that asthma and autonomic abnormalities exist (102). A recent publication attributes the development of bronchial asthma to the blocking of β-adrenergic receptor(s) by an antibody (103).

A report by Murphy and Wilson (104) investigated the results of osteopathic adjustments to the fourth and fifth dorsal vertebrae in 20 cases of asthmatics. Seventy-five percent of the cases obtained some relief. A pilot study on the effectiveness of chiropractic treatment on asthma had inconclusive results (105). Controlled or comparison treatment clinical trials are needed.

For the chiropractic management of this condition, it is helpful to classify the asthma as either mucoid (wet) or nonmucoid (dry). Excessive mucous production often follows an acute respiratory infection that may provoke an acute asthmatic attack. The patient will have a "wet" sound during ventilation. There is some literature indicating that parasympathetic nervous system dysfunction will lead to this clinical picture. Clinical observations have associated the upper cervical portion of the spinal column (C0-C5) and asthma which is characterized by excessive mucous secretion (6). Less commonly involved are spinal lesions of the sacroiliac articulations. In the child it is important to consider displacements of unfused sacral segments (e.g., retrolisthesis of S2) as they may be contributory (6). Inhalation of steam may be of help in loosening mucous build-up.

The nonmucoid asthmatic will not have excessive mucous production. The airways will have a "dry" sound during the attack. This is also the type that afflicts the majority of adults who are afflicted with asthma. It has been hypothesized that because of sympathetic depression there is a parasympathetic over-ride which causes bronchoconstriction. During the acute episode the lower thoracic region should be suspected as an area of spinal dysfunction which may be contributory. The dry asthmatic type may have spinal lesions in the lower thoracic (T7-T12) and the cervical thoracic junction (C7-T3) (6). Evidence that adjustments to this area cause increased sympathetic nervous system activity is supported by basic neurologic data by Jindal and Kaur (106). They concluded that bronchodilation was chiefly controlled by the sympathetic nervous system.

During the first 6 weeks of treatment, lesions in the nonsympathetic portions of the spinal column (upper cervical, sacroiliac) should not be adjusted when managing a patient with a dry asthmatic condition (6). Because of hyperventilation, dehydration should be considered as a potential complication after an attack. The patient should avoid refined carbohydrates and fats in the diet (107). Vitamin supplementation including vitamins A, C, E and
B-complex should be encouraged (6). Vitamins C and E plus supplemental bioflavonoids have been found to help inhibit histamine release from mast cells that have been stimulated by various antigens (108).

General Respiratory Dysfunction

Side pain during inspiration may be the result of intercostal neuritis or muscle spasm. A subluxation of the midthoracic region should be suspected (6). Rib subluxations can be considered but tend to be less common than vertebral lesions (6). Dysfunction of the alimentary canal (e.g., hiatal hernia, hyperacidity, gastritis, etc.) may interfere with respiratory function.

Pertussis

Whooping cough is an acute, highly bacterial, contagious disease characterized by a paroxysmal or spasmodic cough that usually ends in a prolonged, high-pitched, crowing inspiration (the whoop). The disease is serious in children under the age of two with mortality being 1 to 2% before the age of one year (49). It is rarely serious in older children and adults, but the elderly should be closely monitored because the disease can be troublesome in someone with a compromised immune system. Hospitalization is generally recommended for seriously ill infants. Chiropractic care should be provided at the bedside in these instances. Oxygen should be given if cyanosis develops. Monitoring of the nutritional state of the infant is important because preexisting or developing malnutrition can adversely affect the outcome.

The experience of many osteopathic physicians has indicated that those individuals who receive manipulative treatment fare far better than those who do not (109–114). In a comparative clinical investigation between an antibiotic treatment and osteopathic manipulation, Kurschner (115) found superior results in the manipulation group. The ninety-five subjects in the study had their outcomes evaluated by recording the average daily coughing spasms over the course of 12 days. Soft tissue manipulation was performed in the cervical, upper dorsal and midthoracic regions. Forceful vertebral adjustments were carried out at those motion segments exhibiting motion restriction. Deviation of the hyoid bone and dysfunction of the articularizations of the first and second ribs at the sternal attachments has been hypothesized to influence the course of whooping cough (109).

GASTROINTESTINAL DISEASE

Stomach

The autonomic innervation for the stomach is via the vagus and segmental sympathetics (T6-T10). Osteopathic researchers (115,116) have correlated somatic dysfunction in the upper cervical region (e.g., C1-C2) and in the midthoracic region (T5-T10) in patients with disorders of the stomach (e.g., gastritis). Beal (19), in his review of the literature, found similar levels of involvement. Wiles (117) demonstrated motility changes in the stomach after upper cervical manipulations. DeBoer and colleagues (118) showed changes in gastrointestinal myoelectric activity (inhibition) in conscious rabbits after spinal manipulation. Dramatic effects were seen when T6 was stimulated. Similar manipulations at T1, T12 and L3 showed progressively smaller effects.

Gonsetad (6) divided gastric disorders into two general types: those affected by the midthoracic area (T4-T10) and those caused by upper cervical (e.g., atlas) lesions. Gastritis that was present between meals (empty stomach) and within one-half hour postprandial was generally related to dysfunction of the upper cervical region, especially atlas-axis. Pain 1½ to 2 hours postprandial was correlated with spinal lesions in the midthoracic region (T4-T10). Peptic ulcers were found to be generally related to upper cervical dysfunction (e.g., atlas-axis) and duodenal ulcers to dysfunction of the sympathetic efferents (T4-T10) (6).

Diarrhea

Non specific diarrhea (e.g., not due to food poisoning) is often caused by upper cervical subluxations, especially C1-C2 (6). Occasionally, the upper lumbar's may be involved. One to two treatments should reveal some improvement in the condition. Dehydration is an important complication. If the skin shows signs of dehydration intravenous rehydration may be needed. Some patients have chronic diarrhea that results from achlorhydria and/or food sensitivities. In these cases folate supplementation may be needed to counteract the deficiency that results from long-standing diarrhea. Diarrhea is common in the child when removed from breast feeding.

Ulcerative Colitis

Ulcerative colitis is a disease of unknown origin. It is characterized by bloody diarrhea. In 10% of patients, a progressive initial attack may become fatal (49). Hemorrhage is the most common local complication. After a differential diagnosis that includes potential bacterial causes, mild cases of ulcerative colitis can be managed by the chiropractor. More severe cases may necessitate medical collaboration. The upper cervical region (C0-C5) should be examined closely and subluxations, if any, reduced as indicated. Jordan et al. (119) describe a case report of a patient who developed a C1-C2 subluxation in association with inflammatory bowel disease (Crohn's). Corticosteroid treatment in patients with severe manifestations is often advocated, however, the long-term side-effects for this form of therapy should be considered by the patient and doctor. Avoidance of sugar and other refined carbohydrates coupled with supplementation of essential min-
erals and glycosaminoglycans (for healing of tissue) may be helpful (108).

**Constipation**

Constipation is defined as infrequent or difficult passage of feces. Mechanical bowel obstruction should be considered in patients with acute constipation, particularly in infants. Diet is important in the management of patients with constipation without identifiable organic causes (e.g., diverticulitis). Bulking agents such as bran and psyllium may be helpful. Dietary supplementation of folate and lactobacilli may also be helpful in the overall management (108). The portions of the spinal column most often detected in patients with chronic constipation involve the upper dorsals (T3-T5), the lower thoracics (T8-T12), and the upper lumbar (L1-L4). Occasionally, the upper cervical region (i.e., C1-C2) may be involved (6).

**ENDOCRINOLOGIC DISORDERS**

**Hyperglycemia**

Diabetes mellitus is a disorder of carbohydrate metabolism resulting from a variable interaction of hereditary and environmental factors and characterized by abnormal insulin secretion or utilization. This leads to inappropriately elevated blood glucose levels that may manifest in accelerated nonspecific atherosclerosis and other metabolic and vascular disorders such as blindness, kidney disease and neuropathy. Clinical manifestations include polyuria, polydipsia, fatigue, weight loss, and glycosuria.

The nerve supply to the pancreas is derived from the celiac plexus which has preganglionic fibers arising from the vertebral segments T6-T10 (7). Little is known about the afferent supply to the pancreas. The right vagus supplies the pancreas with parasympathetic innervation (120). The nerve fibers are vasomotor (sympathetic) and parenchymal (parasympathetic and sympathetic). Some fibers make synaptic contact with acinar cells before innervating the islets. This suggests a close association between the exocrine and endocrine functions of the pancreas.

Historically, work in the area of carbohydrate metabolism and spinal lesions was carried out by Deason in 1911 (121). Bandeen (122), in 1926, found a specific area of the spine to treat in diabetes through uncontrolled clinical observations. The areas outlined ranged from the tenth dorsal through the first lumbar. They advocated procedures that would improve the mobility in this region. Other osteopathic clinicians found lesions of the lower thoracic region (T5-T10) in patients with pancreatic disorders (123–125). Gonstead (6), through his clinical observations found an association with spinal lesions of the T9-T10 and T10-T11 motion segments and diabetes mellitus.

**Hypoglycemia**

Blood glucose disturbances characterized by a hypoglycemic state have been detected in patients with subluxation of the upper cervical region, especially C1-C2 (6). This area of the spine is thought to influence the function of the pancreas through vagal interactions. The avoidance of alcohol and refined carbohydrates should be encouraged in the hypoglycemic patient. The mainstay of corrective diets has been a moderately high protein intake (to promote gluconeogenesis). Also, a high fiber intake appears to reduce the rapid insulin secretion that occurs in response to dietary carbohydrates (108).

**Hypothyroidism**

Although it has been speculated that hypothyroidism (in the advanced stage of the adult it is referred to as myxedema) is the result of an autoimmune disorder (49), the cause is basically unknown. The disease is characterized by weakness, lethargy, decreased sweating, intolerance to cold, enlargement of the tongue, and nonpitting edema of the subcutaneous tissues (126). Disturbances of the menstrual cycle in females and migraine headache may also be related to lowered thyroid function (6, 48).

The nerves to the thyroid gland are derived from the superior, middle, and inferior cervical ganglia of the sympathetic chain (7). The ganglia receive their nerve supply from the upper thoracic segmental levels.

Marked reduction in thyroid hormone levels can be determined from blood panels measuring T3, T4. Increased thyroid stimulating hormone (TSH) production would also be present in the primary hypothyroid patient because the pituitary gland will attempt to compensate by secreting more TSH. Low TSH levels in a patient may be indicative of secondary hypothyroidism from pituitary insufficiency. Pain syndromes may be related to hypothyroidism. The theory behind this suggestion is that noxious signals from painful inflamed tissues (e.g., trigger points) are transmitted to the CNS where the secretion of ACTH from the pituitary is stimulated. This, in turn, leads to an elevated secretion of cortisol, which has been shown to reduce the intracellular conversion of T4 to T3, the latter having three to five times the metabolic activity of the former. The standard laboratory tests for serum levels of Free T4 and Free T3 do not indicate whether the intracellular thyroid hormone activity is proportionate or similar to the serum levels.

The use of a basal temperature test has been proposed as a more sensitive test in evaluating thyroid function because lowered body temperature may be indicative of low thyroid or metabolic activity (48). This is best measured at the axilla, and the normal value (morning, before arising) should be between 97.8 and 98.2 degrees. Infection (e.g., sinus infection) may raise the basal temperature, and other dysfunctional states (e.g., pituitary or
adrenal gland insufficiency, starvation) may produce a false low reading. Differential diagnosis of the various causes is critical to appropriate management. The basal temperature test should be supplemented with the appropriate blood panel and clinical correlation. The sensitivity and specificity of the basal temperature test have yet to be determined.

Spinal dysfunction at the cervicothoracic junction (C6-T3) has been observed in patients with hypothyroidism (6). Foods high in goitrogens should be avoided. These include cabbage, turnips, rapeseeds, mustard seeds, groundnuts, cassava, and soybeans. They are natural inhibitors to the thyroid, and their effect is inactivated with cooking (89).

Hyperthyroidism

Hyperthyroidism (e.g., Graves' disease) is a disease of unknown origin. It is thought to be caused by antibodies (thyroid stimulating immunoglobulins) that act on TSH receptors to produce inappropriate overstimulation. The most frequent symptoms of hyperthyroidism are nervousness and hyperactivity, increased sweating, hypersensitivity to heat, palpitations, fatigue, increased appetite, weight loss, tachycardia, insomnia, weakness, and frequent bowel movements (occasionally diarrhea) (49). Subluxation of the upper cervical region (C0-C5) may be contributory to the disease process (6).

Hypoadrenalism (Addison's Disease)

Hypoadrenalism etiology is related to progressive destruction of the adrenal cortex from chronic infectious diseases (e.g., tuberculosis, histoplasmosis, cryptococcosis). Some cases of hypoadrenalism result from the autoimmune destruction of the adrenal cortex with the adrenal medulla left intact. In 70% of patients, the etiology is an idiopathic atrophy of the adrenal gland (49).

The suprarenal plexus is formed by branches from the celiac ganglion, celiac plexus, and the greater splanchnic nerve. It has a larger autonomic supply than any other organ relative to its size (7). The parasympathetic supply is from the vagus and the sympathetics arise from spinal cord levels T8 to L2 (19); therefore, subluxations in these areas should be ruled out (6). Large amounts of Vitamin C are found in the adrenal gland. It is therefore suggested that a supplement be considered in the patient’s management. Because smoking increases the body’s need for Vitamin C, it should be discouraged. Supplementation with liberal amounts of the B-complex vitamins may be helpful for the patient. These vitamins function as coenzymes for metabolic reactions, compensating for the increased metabolism (89).

Symptoms of hypoglycemia may occur in patients with hypoadrenalism. They should be advised to have food around in case of an attack and to eat small protein-rich meals throughout the day. A meal at bedtime might be useful for preventing early morning hypoglycemia (89).

Other cases of adrenal cortical insufficiency might be the result of the adrenogenital syndrome. In this disorder, certain enzyme deficiencies cause hormonal synthesis to be shunted away from major hormone production (cortisol and aldosterone) to increased production of androgens and some estrogens. The latter hormones do not exert negative feedback on the pituitary secretion of ACTH. This hormone tends to be elevated due to the lack of sufficient serum cortisol exerting a negative feedback. Therefore, the adrenal cortical activity is stimulated greatly, but the amounts of cortisol and aldosterone secretions are subnormal and the secretion of adrenal androgens are elevated. Female patients will tend to have very obvious signs of masculinization, but the condition is difficult to detect in males.

Hyperadrenalism

Hyperfunction of the adrenal cortex can result from increased pituitary secretion of ACTH. Excessive production of androgens will result in adrenal virilism and hypersecretion of glucocorticoids produces Cushing’s syndrome. Gonstead (6) has hypothesized that subluxations of the upper cervical region (C0-C5) could result in a relative sympathetic override causing hyperadrenalism. The pituitary's influence on adrenal function is well known. Burns (127) has shown how lesions of the upper cervical region can create dysfunction (e.g., edema) of the pituitary gland in laboratory animals.

ARThRITIS RELATED DISORDERS

Gout

Gonstead (6) found somatic reflections in patients with gout at segmental spinal levels with innervation to the kidneys (T10-L2). He also advised drinking unsweetened cherry juice (not from concentrate) as an adjunct to the diet. The patient should avoid foods high in purine content (89) (See Table 13.3), alcohol, and foods rich in fructose (108).

CANCer

Relatively little is known about the proposed influence of neuromechanical lesions of the spinal column and the promotion of cancer. The sympathetic nervous system (SNS) is concerned with the initiation of the immune or inflammatory response. The chain of reactions that follows leads to cell-mediated, homograft immunity (128). The pathogenesis of cancer has been considered to be related to alteration of the immune system. Paralysis of the SNS through physical, viral or chemical agents
Table 13.3.
High Purine Content Foods

<table>
<thead>
<tr>
<th>Food</th>
<th>Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchovies</td>
<td>Heart</td>
</tr>
<tr>
<td>Bouillon</td>
<td>Herring</td>
</tr>
<tr>
<td>Brains</td>
<td>Kidney</td>
</tr>
<tr>
<td>Broth</td>
<td>Liver</td>
</tr>
<tr>
<td>Consomné</td>
<td>Mackerel</td>
</tr>
<tr>
<td>Goose</td>
<td>Meat Extracts</td>
</tr>
<tr>
<td>Gravy</td>
<td>Mincemeat</td>
</tr>
</tbody>
</table>

could promote the evolution of spontaneous, induced or transplanted tumor (129).

Lesions of the SNS have previously been shown to increase the incidence (130,131), induction (132), and, take and growth (133), of a tumor. The participation of the autonomic nervous system in the mechanisms of chemical hepatocarcinogenesis has been well described by Gurkalo and Zabehzinski (134). Pharmacologic activation of the sympathetic nervous system by means of peripheral alpha-adrenoreceptor stimulation and through blocking of beta-adrenoreceptors and cholinoreceptors stimulates proliferative activity and hence hepatocarcinogenesis. In contrast, the inhibition of alpha-adrenoreceptor function and stimulation of beta-adrenoreceptors and cholinoreceptors have an anticarcinogenic effect.

Gnostead hypothesized that many cancers, in the absence of obvious carcinogens (e.g., nicotine), were due to generalized inhibition of the sympathetic nervous system. Hypothyroidism was also apparently related. The spinal management of a patient with cancer should have special attention directed at the upper thoracic spine (C6-T3) and other areas that have effects on the sympathetic outflows. This is considered only in the absence of any contraindications to manipulation (e.g., lytic metastasis of the neural arch). Until such time as there is documented therapeutic proof of a positive effect of spinal adjustments on the course of any form of cancer, it is best to explain to the patient that your management is concerned only with reduction of neuromechanical lesions (i.e., subluxation) of the spinal column. Development or aggravation of a preexisting cancer might be prevented or inhibited by a low sugar, low fat, high fiber diet, supplemented with beta-carotene and vitamins A, C and E (108).

Leukemia

The spleen receives sympathetic innervation from spinal levels T7-T10. Its functions include phagocytosis, cytopoiesis, erythrocyte storage, and the initiation of immune responses. Laboratory animals with mechanical lesions of the ninth thoracic vertebra show a spleen larger in size than normal. Blood counts of these animals have a larger proportion of immature granular cells when compared with controls. Blood counts were made for 90 human subjects with ninth thoracic lesions but with no pathogno-

monic symptoms. Each case demonstrated increased leukocyte count with a greater proportion of granular myelocytes and immature granular cells. In another study, blood counts were performed on 63 patients with splenomegalic leukemia. In each patient, a lesion of the ninth thoracic vertebra was the most marked structural abnormality, other than the enlarged spleen (135). The blinding procedures in this investigation, if any, are unknown. In eight of the patients, the spleen returned to its normal size after correction of the vertebral lesion, and the patients made a complete recovery. The disease in these patients apparently had been in an early stage. About 20% of patients with chronic granulocytic leukemia will survive longer than 5 years and 2% will survive longer than 10 years (49); therefore, 8 cases from the 63 presented represent an almost insignificant percentage (i.e., 13%) of recovery. It is nonetheless quite interesting, and more aggressive clinical research (cohort study or controlled clinical trials) should be pursued in this area.

NEUROLOGIC DISORDERS

Epilepsy

Epilepsy is a chronic disorder characterized by paroxysmal brain dysfunction due to excessive neuronal discharge (136). The cause for most seizures remains unknown. For those patients who show a high voltage spike on electroencephalography, this may be indicative of an intracranial lesion, usually in the temporal or frontal lobe. Plain radiographs of the skull may provide useful information, particularly in the adult. Computerized tomography (CT) and magnetic resonance imaging (MRI) are important diagnostic aids because approximately 20% of late onset epileptics have operable tumors such as meningiomas. Neurologic consultation is important in the differential diagnosis of epilepsy.

Ancillary tests should include serology for syphilis, electrocardiography to exclude heart block, and blood sugar tests. Hypoglycemia is a potential cause of epilepsy. This can be due to an islet cell tumor or caused by functional disorders of the spine (See Hypoglycemia). Gnostead observed that petit mal seizures were often related to the upper cervical region (6).

Most seizures rarely end with complications. A brief period of cyanosis usually occurs during the tonic phase due to paralyzation of the respiratory muscles. The patient then begins respiration during the clonic phase of contraction. During the clonic phase, the tongue can be bitten and there may be foaming of the mouth.

The condition “status epilepticus” is present when repeated seizures occur without any intervening period of consciousness. Emergency room referral is mandatory. Unless the convulsions are stopped, coma deepens, and death occurs. Status epilepticus can be precipitated by the sudden withdrawal of anticonvulsant medication, espe-
cially barbiturates. The seizures may occur several days after the withdrawal of the drugs (137). Headache is a common sequel to seizure, and patients will usually sleep for several hours after an attack.

TEMPORAL RELATIONSHIP

Nocturnal attacks are most likely to occur shortly after going to sleep or between 4 and 5 a.m. The most common time for a diurnal attack is soon after awakening (137). The seizure that occurs within one hour of awakening may be related to subluxation complexes in the upper lumbar spine and thoracic region (6). Gonstead observed that, generally, seizures during the day were associated with upper cervical subluxations, and those that occurred at night, with lesions in the sympathetic nervous system (6).

MANAGEMENT

In the child with epilepsy, an AS condyle should be ruled out because this subluxation may cause severe neurologic dysfunction (See Chapter 11). One to four adjustments should be sufficient for subluxation reduction depending on the chronicity. If there is a regular frequency to the seizure, the upper cervical spine should be suspected (6). Often times seizures will occur just before menstruation in the female. The upper lumbar and lower thoracic spine should be checked in these individuals, because there may be an association between ovarian function (i.e., hormone levels) and the seizure.

If the seizure occurs during the spinal examination this may be helpful in isolating a specific subluxation. Pressure should be applied to the subluxation in the appropriate line of correction or pattern of thrust. If the symptoms abate, then this line of correction should be duplicated during the adjustment (6).

Multiple Sclerosis

Multiple sclerosis (MS) is a disease of unknown origin. Medical treatment of multiple sclerosis usually involves ACTH and corticosteroids, neither of which have shown conclusively that they alter symptomatology during the acute phase or reduce the relapse rate in the chronic patient.

The diagnosis of MS is difficult. The onset is extremely variable and the disease may suddenly develop in otherwise healthy young adults (137). The two major factors in the diagnosis of MS are:

1. Signs and symptoms of disseminated disease
2. A tendency to relapse and remit

The initial symptoms of the disease are usually motor weakness, numbness or paresthesia, and ataxia of gait. Visual symptoms may also occur, such as blurring and diplopia.

The chiropractic management begins first with a proper diagnosis. Special studies such as MRI and CT scanning are helpful when the disease has advanced. Cerebrospinal fluid analysis should be performed because there may be an increase in mononuclear cells and total protein content. Neurologic consultation is recommended due to the need for comprehensive neuropsychological testing.

Many patients report a history of physical trauma at the spinal region which eventually becomes symptomatic (37). Any irritant to the nervous system (e.g., subluxation) could predispose an area to myelin sheath degeneration. Chiropractic treatment may make portions of the nervous system less vulnerable to other alleged mechanisms of MS such as autoimmune interactions or a slow acting virus. A history of a fall on to the buttocks may be reported by some patients necessitating a comprehensive examination of the lower spine, especially the sacroiliac joints and coccygeal region. Subluxation complexes of the upper cervical region (C0-C5) are often present in patients with multiple sclerosis (6). If the individual has a hyplordotic or kyphotic cervical curve, this will place adverse mechanical tension on the spinal cord (See Chapter 2). Efforts to restore the normal lordosis should be implemented. Due to the many remissions characteristic of the natural history of the disease, it is difficult to determine the usefulness of any particular therapy. A low fat diet supplemented with essential fatty acids should be encouraged because this appears to retard the disease process and reduce the incidence of new attacks (138). Heavy metal toxicity has been suggested by some to be related to the development of MS.

Bell's Palsy

Bell's palsy is defined as idiopathic unilateral facial paralysis of sudden onset. It is thought that the mechanism involved is edema of the seventh cranial nerve due to an immune or viral disease. This results in compression and ischemia in the facial nerve as it travels its course through the temporal bone. Other neurologic symptoms are usually not present. If other neurologic signs begin or there is an insidious onset which becomes progressively worse with time, this may indicate a central nervous system lesion such as tumor (139,140).

This disorder is more commonly associated with diabetes and pregnancy. Pain behind the ear usually precedes the facial weakness and complete paralysis may ensue within hours. Other conditions that can produce facial palsy include tumors, herpes zoster infection of the geniculate ganglion, Lyme disease, AIDS, and sarcoidosis. The upper cervical region (C0-C5) should be examined closely. The temporomandibular joint (TMJ) should
also be checked because a small proportion of patients may also have dysfunction at this site (6).

Trigeminal Neuralgia

Trigeminal neuralgia, or tic douloureux, is a facial pain syndrome of unknown etiology that usually develops in middle or old age. The reason for the age relationship is unclear. The tic is from a sharp lightning-like pain of the superior mandibular or maxillary branch of the trigeminal nerve.

In many instances the trigeminal nerve is in close relation to vascular structures and compression of the nerve is thought to be the cause of the disorder, but this is yet to be proven. Sensory stimulation, such as the wind blowing on the face, touch, or cold, at “trigger zones” may precipitate an attack. These trigger zones can be very unpredictable. Flexion of the head appears to also precipitate an attack in some patients (141). The anxiety of not knowing what may trigger an attack can lead to severe depression or even suicide.

The upper cervical region is commonly involved in these patients (142). Temporomandibular dysfunction may also be present and should be addressed. The chiropractic management can be difficult at times. For example, it is important to not overadjust an area of involvement. The temperature pattern of a paraspinous thermography instrument should be watched closely. A pattern (e.g., 20-point differential to the right at C1) should be established before commencing adjutive treatment. Only when the pattern is present should an adjustment be performed. An instrumentation reading towards the opposite side on a given day would contraindicate an adjustment (6).

Psoriasis

Psoriasis is a fairly common chronic disease affecting 2 to 4% of the white population and far fewer blacks (49). It is characterized by dry scaling silvery papules and plaques that recur in various sizes on the skin due to accelerated epidermal growth. Many patients present with severe itching. This condition is considered by many to be incurable.

Seven to fifteen percent of people with psoriasis have arthritis associated with it. This arthritis is most common in the small articulations especially the distal interphalan-geal joints in the hands, small joints of the feet, sacroiliac joints and the spine. Sixty to seventy-five percent of patients with psoriasis have HLA-B27 in the blood (49).

Spinal lesions in individuals with psoriasis have been found to vary from C7 to L1 (6). The patient should be advised to maintain a balanced diet with limited amounts of red meat and the avoidance of acidic foods. A report by Bittiner et al. (145) has indicated a positive effect after fish oil supplementation. The use of stimulants (e.g., caffeine) should be avoided (6). Exposure to sunlight and treatment with ultraviolet light have sometimes been found to be useful. The skin should be well lubricated after the UV application.

OPHTHALMIC DISORDERS

The eyes and the optic tracts can be considered extensions of the brain. These structures are subject to the same vaso-motor reactions as those which affect the rest of the brain and the meninges (146). Retinal examination gives important information concerning the circulation through the brain itself. The nutrition of the eye depends on normal blood flow, which is subject to the vasoconstrictor activities of the nerve centers in the upper thoracic cord segments. The innervation is ipsilateral; the left sympathetic chain affects the blood flow of the left brain and the left eye. Dysfunction of the sympathetic nervous system through lesions of the upper thoracic motion segments may create circulatory disturbances leading to vision disorders.

The fifth and seventh cranial nerves may be affected by lesions of the occiput (146). The edema associated with the inflammatory response can exert pressure on the connective tissues at the base of the skull, the nerves, and their ganglia. Becka (147) has provided a review of the autonomic innervation of the eye. He states, “Cord segment irritation could result in stimulation of the sympathetic preganglionic fibers with resultant hypersympathicotonia, which could alter the balance of the system and result in ocular dysfunction.” He and Wilson (148) cite a role for manipulative treatment of the spine in the treatment of amblyopia.

Visual recovery after chiropractic intervention has
been described in a case report by Gilman and Bergstrand (149). The 75-year-old patient made a full recovery after adjustments to the upper cervical region (i.e., atlas).

Briggs and Boone (150) demonstrated direct effects on pupillary diameter following upper cervical adjustments. A parasympathetic response was obtained following atlas adjustments; however, when segments C2 through C5 were adjusted, both parasympathetic and sympathetic responses were observed. The small sample of subjects precludes any definitive statement on whether a parasympathetic or sympathetic response will be seen after adjustments of the cervical spine.

In an experiment using laboratory animals, Burns (151) determined that manually created subluxations of the second thoracic vertebra exerted an immediate influence on the pupillary reactions of the eyes. These changes reversed after reduction of the lesions. Somatic dysfunction of the upper cervical region (C0-C3) and the upper thoracics (T1-T3) should be ruled out in anyone with functional disorders of the eye (151). Indirectly, lesions of the lower thoracic (e.g., T9) vertebrae may influence vision through the development of cataracts from diseases such as diabetes mellitus (146).

Direct manipulation of the eyelids, lacrimal apparatus, cornea, etc. has been advocated by Ruddy (152) in the treatment of many eye disorders (e.g., hordeolum, blepharitis, etc.). Experience has been that the major vertebral lesion should be sought out and reduced. Multiple areas should not be adjusted as this appears not to influence the patient in as optimal a manner (6,146).

OTOVESTIBULAR DISORDERS

Since the first adjustment in 1895 (153), an empirical basis for chiropractic treatment of otorlogic disorders has been present. The role of the sympathetic nervous system in disorders such as tinnitus, unilateral or bilateral functional hypoacousis and vertigo is well known. Reflex stimulation of the sympathetic system and purely vascular (compression of the vertebral artery) factors have been implicated in the etiology of these disorders. Terret (154), in his review of the literature advises that patients with symptoms of tinnitus should be given a trial of spinal manipulative therapy, especially in light of the fact that most medical therapies for this disorder are entirely based on empirical evidence. One of the cases he reviews had symptoms of vertigo, tinnitus, and unilateral deafness. The patient finally responded to manipulative treatment when the T4-T5 motion segment was adjusted (similar to Harvey Lillard in 1895).

Management

In a noncontrolled study by Zerillo and Lynch (155), improvement in hearing was noted in 19 of the 59 patients (32%) who received chiropractic treatment. Vertigo remissed in 64% of the patients (n = 80) and decreased in the remainder.

A study by Fitz-Ritson (156) of 235 patients with cervicogenic vertigo found that 90% were symptom-free after eighteen treatments. The patients that responded best tended to have primarily upper cervical joint problems (subluxations).

Gonstead (6) found that the upper cervical region, especially C1-C2, were involved in patients with vertigo. Tilting the head towards the involved side will usually accentuate the problem and may help in identifying the lesion. Positive results are generally seen after a few adjustments. Purse (91), in a large series of cases, found that patients with acute otitis media generally had concomitant upper cervical motion restrictions.

RENAL DISEASE

The sympathetic innervation of the kidney arises from segmental spinal levels T10-T12 (19). The vagus nerve supplies the parasympathetic innervation. The main function of the autonemics is vasomotor.

Several osteopathic clinicians and researchers (157–163) have found a correlation between renal disease (e.g., nephritis, failure) and somatic dysfunction of the thoracolumbar junction (T9-L3). Gonstead (6) associated subluxation complexes of primarily the T9-T10 and T10-T11 motion segments in patients with renal failure.

MALE REPRODUCTIVE DISORDERS

Impotence

A careful physical examination is important because neurologic and vascular disorders (e.g., diabetes mellitus), can be the etiology in 20% of cases (49,50). Many patients simply have an exaggerated sympathetic nerve activity accompanied by a depressed parasympathetic activity. The latter must be adequate for the male to have an erection.

Eighty percent of secondary impotencies are caused by psychic factors. Referral to a marriage counselor or clinical psychologist may be indicated if the patient does not respond to reassurance and education about the dysfunction.

Stresses or other circumstances that cause elevated secretion of prolactin (such as the destruction of the prolactin inhibitory dopaminergic nerves in Parkinson's disease) can produce impotence through desensitizaton of testosterone receptors in the brain.

Urinary bladder and sexual dysfunction and their relation to disorders of the low back have been investigated by Suarez et al. (164). In their series of 97 consecutive male patients they noted that visceral complaints were often associated with disorders such as lumbar disc herniation, spinal stenosis, and segmental instability.
Falk (165) has presented three patients with bowel and bladder dysfunction secondary to lumbar spine disorders. In each case the dysfunction appeared to improve after chiropractic treatment.

References

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Appendix 13A. Increased Fiber Diet

Description

This is a regular diet with the substitution of whole grain breads and cereals, and increased amounts of fruits and vegetables. The diet contains approximately 8–9 grams of crude fiber in contrast to 3–4 grams in the regular diet.

Indications for Use

The aims of this diet are to:
1. Increase the weight and volume of residue reaching the large intestine.
2. Increase gut motility and normalize transit time.
3. Decrease intraluminal colonic pressure.

For many patients with chronic constipation and some with diverticular disease and irritable bowel syndrome, this diet may promote more regular bowel habits and partial relief of symptoms.

This diet is contraindicated when changes due to inflammation have caused stenosis or narrowing of the intestinal lumen.

Nutritional Adequacy

The diet provides at least the proportions of nutrients provided by the regular diet. However, absorption of calcium, iron, zinc and possibly other trace minerals may be compromised by this diet.

Dietary Guide

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Foods Included</th>
<th>Foods Excluded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beverages</td>
<td>All</td>
<td>None</td>
</tr>
<tr>
<td>Breads</td>
<td>All. Include 3 or more servings daily of whole grain products.</td>
<td>None</td>
</tr>
<tr>
<td>Cereals</td>
<td>All. Include 1 serving of bran cereal daily.</td>
<td>None</td>
</tr>
<tr>
<td>Desserts</td>
<td>All. Suggestions include desserts with coconut, nuts, raisins, dates, seeds,</td>
<td>None</td>
</tr>
</tbody>
</table>

Eggs

All | None

Fats

All | None

Fruits and Juices

All. Include at least 2 servings of fruit daily, preferably fresh fruit with skin.

Meats

All | None

Potatoes and Alternatives

All | None

Soups

All | None

Sweets

All | None

Vegetables

All. Include at least 4 servings daily, 2 raw.

Appendix 13B. Fat Restricted Diet

Description

This diet limits the quantity of dietary fat to approximately 50 grams per day.

Indications For Use

The physician may choose this diet for a variety of conditions. Some examples include pancreatitis, multiple sclerosis, gallbladder disease, and type I hyperlipoproteinemia. The diet may be used in other disease states in which a disturbance in the digestion or absorption of fat occurs.

Nutritional Adequacy

This diet meets the Recommended Daily Dietary Allowances with the exception of the iron requirement for women.

Kilocalories = 1700
Carbohydrate = 217 gm
Protein = 76 gm
Fat = 47 gm

Dietary Guide

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Foods Included</th>
<th>Foods Excluded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beverages</td>
<td>All except those in other food groups.</td>
<td>See other groups.</td>
</tr>
<tr>
<td>Breads</td>
<td>Regular bread, rolls, crackers except as noted.</td>
<td>Biscuits, pancakes, waffles, muffins, sweet rolls, doughnuts. Other rich breads and rolls.</td>
</tr>
<tr>
<td>Cereals</td>
<td>All cooked or ready-to-eat cereals except as noted.</td>
<td>Dry cereals containing coconut or coconut oil.</td>
</tr>
<tr>
<td>Cheese</td>
<td>Dry curd or low-fat cottage cheese.</td>
<td>Cheeses made from whole milk, cream cheese, spreads.</td>
</tr>
</tbody>
</table>
Desserts
Sherbet, gelatin,
ices, pudding made
with non-fat milk,
Angel food or
spoon cakes, jelly
roll.

Other desserts rich in
fat: pastry, cake,
cookies, ice cream,
ice milk, custard,
mousse. Desserts
made with whipped
topping, chocolate,
nuts.

Appendix 13C. Low Cholesterol Diet

Description
Cholesterol from dietary sources is reduced to 300 mg. or less.
Foods containing polyunsaturated fat are increased and foods
containing saturated fat are limited so that the P/S ratio will be
between 1.5 and 2.0.

Indications for Use
For patients with hypercholesterolemia (Type IIa).

Nutritional Adequacy
This diet meets the Recommended Daily Dietary Allowances
with the exception of the iron requirement for women.

Kilocalories = 1800
Carbohydrate = 235 gm
Protein = 81 gm
Fat = 62 gm
Cholesterol = 170 mg

Dietary Guide

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Foods Included</th>
<th>Foods Excluded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beverages</td>
<td>All except those noted in other food groups.</td>
<td>None.</td>
</tr>
</tbody>
</table>
| Breads       | All regular breads, rolls, crackers except as noted.                         | Egg or cheese bread, commercial sweet
rolls, buttery rolls.                       |
|              | Baked goods, pancakes, waffles, French toast containing no whole milk or egg yolk and made with allowed fat. | Flavored crackers and snack foods made with saturated fat. |
| Cereals      | All cooked or ready-to-eat cereals except as noted.                          | Cereals containing coconut or coconut oil. |
| Cheese       | Low-fat cottage cheese, low-fat processed cheese.                            | Cheeses made from whole milk. Cream cheese, cheese spreads. |
|              | Natural cheeses made from skim milk: mozzarella, hoop, farmer's, Sapsago, ricotta, etc. |                                           |
|-----------|--------------------------------------------------------|-----------------------------------------------------------------|------|-------------------------------------------------------------------------------------------------|---------------------------------------------|
| Eggs      | Any style egg or egg substitute. Limit egg yolks to 2–3 per week. | None. | Potatoes and Substitutes | White and sweet potatoes, rice, pasta, dried beans. | Dishes made with whole milk, egg yolk, cheeses or fats not allowed. Potato chips made with saturated fat. Refried beans, pork and beans. Egg noodles. | All others. |
| Fats      | Polyunsaturated oils and margarine. Oil-based salad dressings. Mayonnaise and mayonnaise type dressings. Use 1 tsp for each ounce of meat consumed. | Butter, lard, suet, salt pork, meat drippings, gravy, cream, hydrogenated vegetable shortening, palm oil, coconut oil. Salad dressings containing cheese, cream, sour cream. Large amounts of avocado. | Soup | Bouillon, fat-free broth, fat-free vegetable soup, cream soup made with non-fat milk. | All other candy. |
| Fruits and Juices | All. | | Sweets | Plain sugar and sugar candies. Jam, jelly, honey, syrup. | | |
| Meat and Substitute | Limit quantity to 6 ounces per day. Use lean beef, lamb, pork, ham only four times per week. May use veal, chicken, turkey, fish, shellfish (except as noted) at other meals. Lean cold cuts such as chicken, turkey, ham, roast beef. “Natural style” peanut butter preferred- 2 tablespoons may | Fatty meats. Sausage, bacon, hot dogs, salami, bologna, organ meats, Goose, duck. Poultry skin. Shrimp. Meats in rich sauces or gravies. Hydrogenated peanut butter. | Vegetables | All raw and cooked vegetables prepared with allowed fat. All vegetable juices. | Vegetables prepared with cream, butter, cheese sauces or saturated fats. |
|           | | | Miscellaneous | Spices and herbs of all kinds. Condiments except as previously noted. Small quantities of nuts except as noted. Cocoa powder. Spray-on vegetable coating for cookware. | Cashew and macadamia nuts. |