Chapter 1

A brief historical perspective

CHAPTER CONTENTS

Cranial manipulative (craniosacral) therapy is one of the fastest growing areas of manual medicine in terms of the numbers of practitioners and therapists learning and applying different versions of its methodology. An institute which teaches one of the main divisions of cranial manipulation, John Upledger's craniosacral therapy (Upledger 1996, Upledger & Vredevoogd 1983), claims to have instructed, between 1985 and 1995, some 25 000 individuals (mainly licensed massage therapists) in the USA alone. In the experience of the author, many of those who have acquired such training appear to utilize the methods as part of whatever else they do clinically, while only a small proportion devote their entire practice to craniosacral work.

With its modern roots in cranial osteopathy, as developed by Sutherland (Sutherland 1939) in the early years of the 20th century, and with parallel and sometimes derivative approaches including craniopathy (Cottam 1956) and sacro-occipital technique (SOT) (DeJarnette 1975/1978), cranial manipulation has become an area of debate, hypothesis and a significant degree of confusion regarding the theories which underpin the methods.

In this second edition chapters have been prepared by experts from different disciplines that specifically examine the perspectives of sacro-occipital technique (SOT), as well as different aspects of the osteopathic and dental variations of cranial manipulation (see Chs 3, 4, 5 and 11).

Many practitioners and therapists, often attracted by the dramatic and frequent successes claimed for these methods, remain unconvinced as to the 'science' of cranial manipulation and confused by the real and apparent discrepancies in the theories and explanations which surround it. It is hoped that these additions, together with the revisions throughout the original first edition text, will help to clarify and, where necessary, demystify the mechanisms involved.

This text will examine both proven and hypothetical aspects of cranial manipulation and will endeavor to guide the reader through the tangle of what is known, what is 'believed' and what is safe in the treatment of dysfunction affecting the soft and hard tissues of the cranium – and the myriad functions and systems that these appear to influence.

The format of the book, following a brief historical overview, will continue with an examination of the main theoretical concepts which underpin cranial manipulation and the research which supports (or fails to support) these theories. It is following this introduction that the new chapters have been placed, after which subsequent chapters offer: descriptions of what cranial motions occur at the various sutural articulations; a discussion of the possible clinical repercussions of cranial restrictions; an expanded illustrated segment offering guidance on assessment and palpation techniques as well as interpretation of findings resulting from these methods. Finally, safe therapeutic measures for the treatment of identifiable patterns of dysfunction involving the craniosacral mechanisms will be presented.

Note

No text can possibly replace taught and practiced manual techniques of assessment and treatment: the intention of this book is to provide information and supportive material which should be utilized in conjunction with reputable training in the methods described.

Not just one mechanism

- In discussing cranial mechanisms a number of overlapping processes need to be considered. We will find at times that we are speaking orthopedically – for example, about mechanical bony restrictions or ligamentous or fascial structural and functional anomalies.
- At other times discussion of abnormalities will involve more subtle factors, dysfunctional situations where interference with normal pulsatile activities or soft tissue properties seems to have occurred and which have no easy, 'gross', structural or orthopedic corollary.
- In other discussions it will be necessary to explore the possibility that bio-electromagnetic energy factors permeate all mechanical, functional and dysfunctional processes and that in some instances there seems to be no way of making sense of craniosacral treatment without hypothesizing energetic involvement.
- The skeptical perspective, which argues that cranial motion is a mirage and that the main benefit of cranial therapy results from the placebo effect, will also be discussed.
- Gross mechanical, subtle pulsatile or energy imbalances – which of these (if any) are we feeling and which are we using? The answers to these questions should become clearer as we explore the theories and practices which surround cranial manipulation.

HISTORICAL PERSPECTIVE

Greenman & McPartland (1995) succinctly summarize the origins of modern cranial manipulative study.

> *Cranio-sacral manipulation was first introduced into the osteopathic profession in the 1930s. Instruction in the field began in the 1940s. The pioneering work of William Garner Sutherland (described in Upledger & Vredevoogd 1983) included years of research into the anatomy of the skull, clinical observation of skull mobility in normal asymptomatic patients, and abnormal cranial mobility in patients with a variety of symptoms. Sutherland evaluated the response of application of restrictive and compressive forces to the skull [commonly his own]. He postulated the primary respiratory mechanism, consisting of*

five elements, as the essential components of the clinically palpable cranial rhythmic impulse (CRI).

The five key elements which Sutherland proposed were:

- inherent motility of the brain and spinal cord
- fluctuating cerebrospinal fluid
- motility of intracranial and spinal membranes (meninges, dura, etc.)
- mobility of the bones of the skull
- involuntary sacral motion between the ilia.

The validity of these concepts, which are fundamental to much of modern cranial manipulation as currently taught, need to be examined, evaluated and understood before palpation, assessment and treatment methods of this region can be usefully discussed and outlined.

The examination of these concepts which follows in the next and later chapters will address the following questions.

1. Is there palpable mobility at the cranial sutures and articulations and if so, what is the significance of such mobility in health terms?
2. What are the reciprocal tension membranes and is there a linking mechanism between cranial and sacral motion?
3. Does a cranial rhythmic impulse (CRI) exist and if so, what is it and, especially, what is its relationship with cerebrospinal fluid fluctuations and flow?
4. What are the forces moving cranial structures and so producing the CRI? Most importantly, are these forces primary or is movement the result of a combination of normal physiological functions such as respiration and cardiovascular rhythms?

In discussing these elements individually there is bound to be some overlap in the areas covered. For example, the concept of cranial sutures being mobile is meaningless without evidence of 'something' which can and does move them; also the view of there being a 'cranial rhythmic impulse' demands that the possible mechanism(s) driving such an impulse be investigated as well as the consensus, if any, as to what that rhythmic rate should normally be.

These cranial fundamentals need to be examined, both together and as independent phenomena, and as a result the research studies cited and discussed are likely to overlap.

Tables are provided to summarize aspects of the research and the reviews in order to give a sense of the variety of sources of research evidence (largely osteopathic but with some neurological, dental, biomechanical and anatomical research as well) along with a view of the chronology of these studies.

Is it really necessary to explore the theories that underpin much cranial therapy? Methods that have been widely used for over 60 years, based on beliefs many of which, as yet, lack verification, clearly require an attempt at clarification in the light of current research and knowledge.

There already exist variations of cranial manipulation that detach from the traditional beliefs deriving from Sutherland's work. There is, for example, the use of cranial manipulation, mainly by physiotherapists, working with craniofacial dysfunction. The authors of a key book describing the methods used state that while studying the literature, 'We quickly found that there was no standardization of manual cranial techniques, not to mention fundamental clinical proof. … One of our basic objectives was to initiate the standardization of cranial manual techniques within manual therapy for various patient groups' (von Piekartz & Bryden 2001).

Aspects of this work will be referred to periodically throughout this text.

Note

It is necessary at the outset to say that, unless clearly stated to the contrary, all the discussions relating to cranial motion refer to adult humans. In some instances infant and animal studies will be referred to and this will be clearly stated.

Cranial structures and their mobility

There is little if any debate relating to the pliability, indeed the plasticity, of infant skulls and dysfunctional states affecting infants in general and neonates in particular will be discussed in a separate section of the book (see Appendix 2).

However, in order for cranial manipulation, as currently taught and practiced, to be taken seriously it is necessary to establish whether or not there is evidence of verifiable motion between the cranial bones during and throughout adult life.

Sutherland (described in Upledger & Vredevoogd 1983) observed mobile articulation between the cranial bones almost 100 years ago and researched the concept for the rest of his life. He also described the influence of the intracranial ligaments and fascia on cranial motion, which he suggested acted (at least in part, for they certainly have other functions) to balance motion within the skull.

He further suggested that there existed what he termed a 'primary respiratory mechanism' which was the motive force for cranial motion. This mechanism, he believed, was the result of the influence of a rhythmic action of the brain which led to repetitive dilatation and contraction of cerebral ventricles and which was thereby instrumental in the pumping of cerebrospinal fluid.

The reciprocal tension membranes (mainly the tentorium cerebelli and the falx cerebri) which are themselves extensions of the meninges, along with other contiguous and continuous dural structures, received detailed attention from Sutherland.

Sutherland described these soft tissues as taking part in a movement sequence which, because of their direct link (via the dura and the cord) between the occiput and the sacrum, produced a total craniosacral movement sequence in which, as cranial motion took place, force was transmitted via the dura to the sacrum, producing an involuntary motion in it.

These functions and the mechanisms that are claimed to drive them, as well as the arguments against their validity, will be discussed in depth in the following chapters and key aspects are summarized in appropriate tables.

The reciprocal tension membranes

If we examine the structure of the cranium we need to look beyond the obvious osseous structures and their articulations and come to an understanding of the soft tissues which relate intimately with it, most notably the dural/meningeal folds which are seen in cranial theory and practice to play a vital role (see Box 1.1 for a summary of the role and attachments of the dural folds which are known as the reciprocal tension membranes, and see Fig. 1.1).

Philip Greenman, Professor of Biomechanics at the College of Osteopathic Medicine, Michigan State University, describes the static and motion potentials of these membranous intracranial dural duplications, as follows (Greenman 1989).

> *[They are] continuously under dynamic tension, so that change in one requires adaptive change in another. In flexion movement [of the cranial mechanism] the tent descends and flattens and the falx cerebri shortens from before backwards. In extension movement just the reverse occurs.*

He goes on to explain that the motion of the craniosacral system results from a combination of articular mobility and alterations in the tensions of the reciprocal membranes and then makes clear what is becoming an increasingly controversial viewpoint when he says:

> *It is through this membranous attachment that the synchronous movement of the cranium and the sacrum occurs. … The tentorium cerebelli can be viewed as the diaphragm of the craniosacral mechanism. It descends and flattens during inhalation as does the thoracoabdominal diaphragm. The pelvic diaphragm is also observed to descend during inhalation. … One can then view the body from the perspective of three diaphragms … in health these diaphragms should function in a synchronous manner. If dysfunction interferes with the capacity of any of the three, it is reasonable to assume that the other two will be altered as well. That is what is observed in clinical practice.*

Greenman points out that – via the continuation of the intracranial dural folds with the intraspinal membranes, attached as they are at the foramen magnum, the upper two or three cervical vertebrae and the sacrum itself – there exists a direct link between cranial and sacral motion (that is, what is known as the 'core-link'). The hypothesis that movement in the skull produces a traction via the dura which moves the sacrum rhythmically (see Fig. 1.2) is a current belief amongst many schools teaching craniosacral therapy. The validity of this view is seriously questioned and discussed in the next chapter (Ch. 2).

Box 1.1 Reciprocal tension membranes – attachments and functions (see Fig. 1.1)

The external layer of the dura is continuous with the periosteum of the skull. Its internal layer forms three duplications which surround the venous sinuses and create dividing barriers for segments of the brain.

Falx cerebri The anterior attachment is to that part of the ethmoid process known as the crista galli, the frontal bone, both parietals and the squama of the occiput, dividing the skull in two. It encloses the superior sagittal sinus.

Craniosacral hypothesis suggests that during cranial flexion ('inhalation' phase) the falx shortens from front to back and during the extension phase ('exhalation') of the cranial cycle, it lengthens from front to back (see Fig. 1.2).

Tentorium cerebelli The 'tent' separates the cerebellum from the cerebrum. Its attachments are to the occipital, parietal and temporal bones and to the anterior and posterior clinoid processes of the sphenoid.

The straight sinus is enclosed where the tentorium cerebelli meets the falx cerebri at the true 'reciprocal tension membrane'.

During cranial flexion ('inhalation') the tent is said to descend and flatten, returning to its neutral position during the cranial extension phase ('exhalation').

Falx cerebelli This duplication of the dura divides the two hemispheres of the cerebellum.

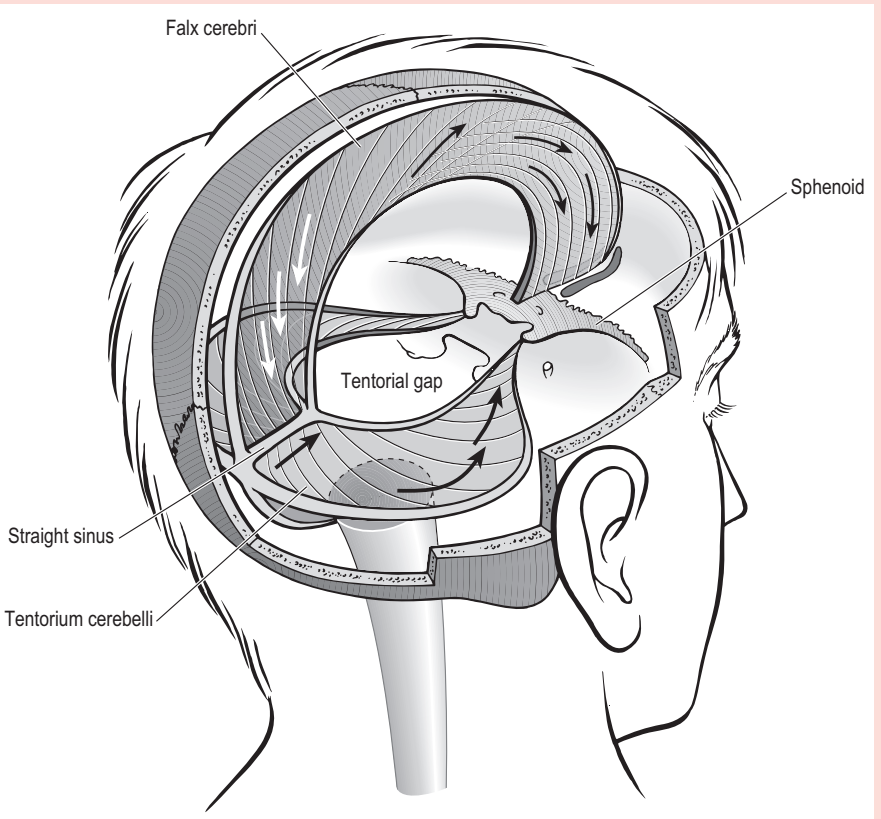
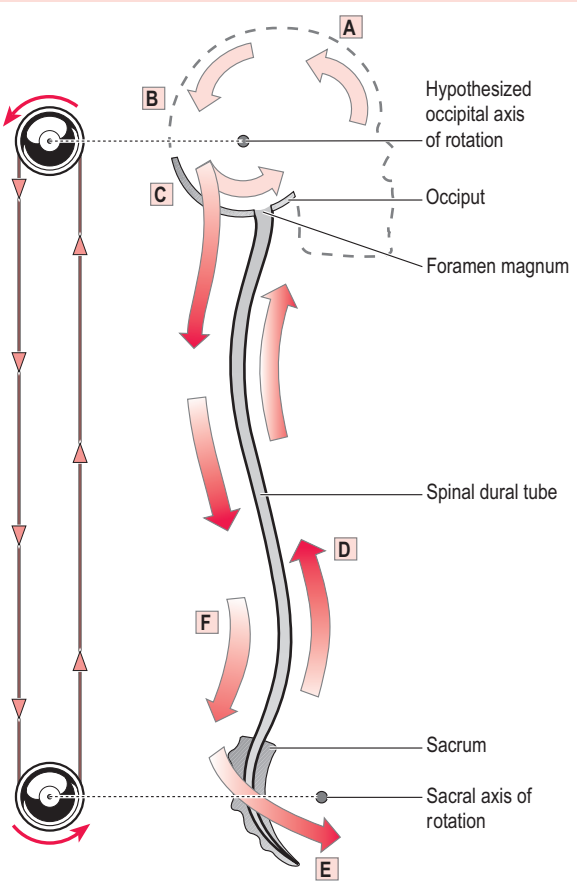


Figure 1.1 The reciprocal tension membranes of the cranium and proposed lines of force acting on them during the flexion phase of craniosacral motion.

Box continues

Box 1.1 Reciprocal tension membranes – attachments and functions (see Fig. 1.1)—*continued*



Flexion phase of craniosacral motion

- **A** Falx moves posteriorly
- **B** ... and inferiorly
- **C** Tentorium drawn laterally
- **D** Anterior aspect of spinal dura moves superiorly
- **E** ... from attachment of spinal dura to anterior face of sacral canal at level of second sacral segment
- **F** ... leading to spinal flexion

Figure 1.2 The hypothesized directions of movement during the flexion phase of craniosacral motion.

Diaphragma sellae This covers the sella turcica ('Turkish saddle') of the sphenoid, which houses the pituitary gland.

Note

1. Tension or restriction in any of these dural duplications influences all the others since they are continuous.
2. They directly influence, and are directly influenced by, all of their osseous attachments.
3. Distortions/restrictions of these soft tissues directly influence venous circulation/drainage.
4. The potential for interference with pituitary function exists via the influence of the diaphragma sellae.
5. There are constant modifications in the respective tensions of these membranes with cranial movement (and, for example, in relation to breathing, where the tentorium cerebelli acts in synchrony with the thoracic diaphragm).

There exists a model for explaining Greenman's statement that 'change in one requires adaptive change in another' when discussing the fascial reciprocal tension membranes inside the skull and their linkages to the diaphragms of the body. He offers the term 'dynamic tension'. An engineering definition would suggest that these tissues are all part of a tensegrity structure. See Box 1.2 and Figures 1.3 and 1.4 for a brief explanation of tensegrity.

Box 1.2 Tensegrity

Tensegrity is a word that derives from the work of architect Buckminster Fuller and his study of geodesic architecture. Fuller attempted to understand why a geodesic dome can carry a large load with a minimal amount of building materials. Fuller concluded that it is not what the structure is made of but rather how its elements distribute and balance mechanical stresses in three dimensions that determined stability. Fuller realized that the dome gains its omnidirectional stability from continuous tension that is resisted locally by a subset of its structural elements. Detailed research into the structure of cells shows that they use tensegrity to organize and mechanically stabilize their cytoskeleton network (Ingber 1993).

Much of the human body utilizes tensegrity to transfer and absorb the mechanical forces it generates and which are applied to it. The skull and its internal architecture can easily be seen to utilize tensegrity principles (see Figs 1.3 and 1.4).

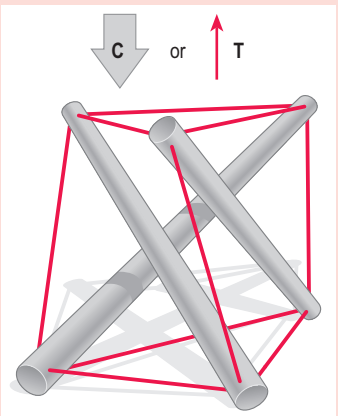


Figure 1.3 A simple model of a tensegrity structure in which internal tensions (T) and externally applied compression (C) forces are absorbed by the component solid and elastic structures by adaptation of form. (Reproduced with permission from Chen C, Ingber D 1999 Tensegrity and mechanoregulation: from skeleton to cytoskeleton. Osteoarthritis and Cartilage 7: 81–94.)

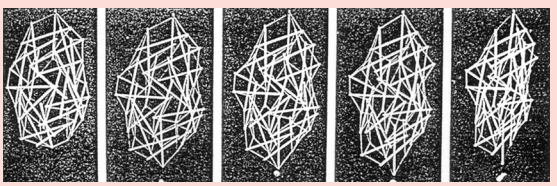


Figure 1.4 A tensegrity cell model under different mechanical loads. This model consisted of a geodesic spherical array of wood dowels and thin elastic threads. The model was suspended from above and loaded, from left to right, with 0, 20, 50, 100 or 200 grams weights on a single strut at its lower end, demonstrating that a local stress results in global structural rearrangements throughout the entire structure (Chen & Ingber 1999). Much of the human body utilizes tensegrity to transfer and absorb the mechanical forces it generates and which are applied to it. The skull and its internal architecture can easily be seen to utilize tensegrity principles. (Reprinted with permission from Wang N, Butler JP, Ingber DE 1993 Mechanotransduction across the cell surface and through the cytoskeleton. Science 260: 1124–1127. Copyright 1993 AAAS.)

Cranial rhythmic impulse (CRI)

It is a basic precept of all cranial teaching that there exists a palpable cranial rhythm, the cranial rhythmic impulse (CRI). This pulsation, while apparently related to other bodily rhythms (thoracic respiration, cardiac pulsations, etc.) is, in cranial theory, seen to be separate and independent of these.

The CRI (variously known as the 'primary respiratory impulse' (Brookes 1981, Upledger & Vredevoogd 1983), 'cranial rhythmic impulse' (Woods & Woods 1961) or 'Sutherland wave' (Magoun 1976)) is widely assessed and employed as a means of cranial evaluation – since the speed and rhythmicity, as well as the quality and/or amplitude, of this rhythmic function represent, it is widely believed, a direct means of assessing the status of the cranial mechanism.

Any increase or decrease in speed or amplitude, any indication of imbalance or an arrhythmic pattern implies the presence of a problem, often of a structural nature involving cranial and/or sacral restrictions, which can be addressed and possibly corrected by appropriate cranial technique.

There are numerous theories as to just what the rhythmic impulse is, many of which are discussed in the next chapter (Ch. 2). As well as a lack of an agreed explanation as to just what these impulses

represent, there is also a variation in the stated rate of pulsation which is said to represent normality.

The most basic question relating to the CRI is quite simply, 'Is it a primary pulsation or does it represent a sensation deriving from a combination of recognizable physiological pulsations, such as heart rate, cardiac contractility, pulmonary blood flow, cerebral blood flow and movement of lymph and CSF?'.

What drives the cranial rhythm?

Sutherland (1939) had definite ideas as to what moves the cranial bones: the cerebrospinal fluid and a pulsating brain.

In 1971 Viola Frymann, herself a respected pioneer of cranial therapy in the osteopathic arena, offered a personal opinion based on over a quarter of a century of experience in this work.

> *The perpetual outpouring of impulses from the brain to maintain postural equilibrium, chemical homeostasis, and so on, conceivably may multiply the activity of individual cells into a rhythmic pattern of the whole brain, small enough to be invisible to the naked eye, but large enough to move the cerebrospinal fluid which in turn moves the delicate articulated cranial mechanism. (Frymann 1971)*

Was she right?

While recent research partially supports her view, most studies contradict it. These perspectives will be outlined and discussed in Chapter 2.

A host of theories have emerged to explain what seems to be an established fact, that there does exist a rhythmic impulse, which can be palpated at the head or almost anywhere on the body surface, which is apparently independent of the major physiological body rhythms (cardiovascular, respiratory, etc.). These theories will be evaluated in the next chapter (Ch. 2) as will the potential value of palpation as evidence of an individual's cranial rhythm.

What are the clinical implications of cranial dysfunction?

Let us assume, hypothetically speaking, that it is possible to establish that mobility exists between cranial bones in normal situations, as well as there being a direct connection between such motion and sacral motion and, further, that this motion has a rhythmicity which is palpable.

What would be the clinical significance of dysfunction in this mechanism – as evidenced perhaps by articular restrictions between specific cranial joints or alterations in the palpated rhythmic impulse or imbalances in the 'normal' cranial–sacral motions? What health repercussions might occur, according to cranial theory?

McPartland gives some indications:

> *Many of the cranial nerves exit the skull from between the sutures; if restricted they may cause many kinds of visceral mischief, such as dyspepsia. Misaligned temporal bones can give rise to temporomandibular joint (TMJ) dysfunction, headache, trigeminal neuralgia, dizziness and predispose children to otitis. (McPartland 1996)*

Upledger & Vredevoogd (Upledger 1996) offer a long list of possibilities, suggesting that the following conditions can often have craniosacral dysfunction involvement or that craniosacral treatment can substantially assist in treating them.

- Acute systemic infectious conditions (citing the antifebrile effect of what is known as CV-4 (compression of the fourth ventricle) technique – see Ch. 6).
- Localized infection (possibly treated using V-spread technique – a method employed to achieve gentle separation of sutural restrictions – see Ch. 6).
- Acute sprains and strains using a variety of techniques.
- Chronic pain problems (using techniques such as CV-4 as well as balancing tissue tension and dural membrane balancing).
- Visceral dysfunction (peptic ulcers, ulcerative bowels, tachycardia, asthma, etc. treated by means of normalizing restriction patterns in the craniosacral system).
- Autonomic nervous system problems such as Raynaud's syndrome (treated by using CV-4 daily).
- Rheumatoid arthritis (CV-4, often applied by a family member, daily).
- Emotional disorders – especially anxiety (using specialized techniques).

- Scoliosis, which is often seen to be a direct result of craniosacral distortions.
- Visual disturbances – especially strabismus which is said to be 'very amenable to the release of abnormal tension patterns in the tentorium cerebelli'.
- Auditory symptoms such as tinnitus and recurrent middle ear problems (via mobilization of the temporal bone).
- Cerebral ischemic episodes, which can be 'very favourably affected by weekly application of the parietal lift technique (see Ch. 6) after thoracic inlet and cranial base restrictions have been released. We have seen marked improvement in syncopal episodes, episodic paresthesias, memory loss and the like, after only three or four weekly treatments'.

While a great deal of the reporting of success of craniosacral therapy remains anecdotal, the sheer volume of these reports and the clinically proven value in treating children's problems utilizing craniosacral therapy (see discussion of research studies in later chapters) make this a compelling degree of evidence.

Box 1.3 Models which attempt to explain cranial therapeutics

In the preface to his excellent book *The heart of listening* (subtitled A visionary approach to craniosacral work), British-trained osteopath Hugh Milne discusses some of the variations currently available on the theme of cranial manipulation (Milne 1995).

> *What is now popularly known as 'craniosacral work', like any art, can be practiced many different ways. Some osteopaths practice 'cranial osteopathy' as a technical skill that focuses on treating symptoms in ten- to twenty-minute sessions. Many chiropractors practice 'craniology' with great mechanical and tactile aptitude in similarly brief visits. Both chiropractors and osteopaths tend to base their work upon the mechanical models of bone movement they were educated in. Gifted bodyworkers use craniosacral work as an adjunct to their hour-long sessions. They tend to interpret what they do in terms of balance, gravity, muscle tonus and fascial length. Massage therapists may employ a few craniosacral techniques at the end of each session. Exceptionally gifted with tactile sensitivity, they tend to let their hands tell them what to do. Christian healers touch the head while 'laying on hands'; they treat by praying. Psychics use craniosacral work as a way to access deep realms of the spirit during 'psychic healing'. Working through visionary perception, they see what is wrong with the head. In 'past life regression', therapists use craniosacral touch to help induct people into sensitive realms of experience. They work in altered states of consciousness, using their extraordinary sensitivity to the body's electrical field, or chi. My sessions encompass aspects of each approach mentioned above, appropriately used, each has its value and its contribution to healing.*

In an attempt to offer some clarity a few further attempts are made in this section to explain some of the different ways in which cranial therapy is used, and the outcomes anticipated.

1. Cranial osteopathy Based on the original research of William Garner Sutherland, this model originally held to the more mechanistic hypothesis of the motive force(s) driving cranial motion, including cerebrospinal fluid fluctuation and a 'primary' respiratory mechanism. The osteopathic therapeutic approach calls for osseous as well as reciprocal tension membrane and fluid factors being considered in treatment of identified dysfunction (Sutherland 1939).

Out of this particular tradition new concepts are appearing, notably as a result of the work of osteopaths such as John McPartland (McPartland & Mein 1997), who suggests that the therapeutic effects of much of cranial work relate directly to a process of entrainment in which the healthier influences of the therapist begin to encourage a normalization in the dysfunctional patterns of the patient. This is described in some detail in Chapter 2. Osteopathic thinking in regard to cranial therapy is explored in greater detail in Chapters 3 and 4. Additional elements relative to the cranial osteopathic approach include recognition of tensegrity features as described in Box 1.2.

2. Craniosacral therapy This is an evolution, by its developer John Upledger, of cranial osteopathy (Upledger 1995). Upledger says:

Box continues

Box 1.3 Models which attempt to explain cranial therapeutics—*continued*

The CranioSacral system is a core system in the human body. In my view it is the place where body, mind, and spirit reside independently and communally at the same time. ... It is quite fascinating to consider that all the very deep work is done within the confines of an anatomically defined physiological system. It suggests that the CranioSacral system and the techniques involved ... offer a bridge between objective science and spiritual healing. CranioSacral Therapy accesses the total human being's self-corrective and self-healing processes. Further the therapeutic approach attempts to maximise patient/client responsibility for their overall well-being.

As a summary these words should suffice to indicate the direction craniosacral therapy has taken, away from the mechanistic and towards ill-defined areas of the therapeutic relationship, which attracts many but is anathema to others. Upledger's training programs are far and away the most popular (worldwide) means of therapists acquiring basic (and safe if they follow the 'grams only' rules) cranial skills. A key feature of the work of Upledger (and McPartland and many others) is the demand that the practitioner/therapist be centered, relaxed and in a virtually meditative state for therapy to be successful.

3. The somatic model (somatic cranial work)

An approach to cranial work has evolved which calls for therapists to harmonize their biological systems (heart rate, breathing, cranial rhythms, etc.) with those of their patients to help in normalization of dysfunction (Norton 1991). Norton's concepts are discussed further in Chapter 4.

Shea (1997) proposes an evolution of this which he explains as follows.

The somatic model blends eastern and western traditions of introspection, interiority, mindfulness, archetypal psychology and cross cultural healing. Somatics involves contact, sensing, excitement, gestalt formation as essential variables in the palpatory sensitivity to not only CRI but also its potency and breath of life as proposed by Sutherland. To contact a fluid system that contains the primary intelligence of life requires authentic presence and the capacity to be still within one's self. These are essential disciplines if entrainment is going to happen. In somatics entrainment or perceptual transference is called matching. Matching has three parts 1/ awareness of shape, sensations, feeling or a movement in one's own body; 2/ an inner act of matching or aligning oneself with this; and 3/ allowing something to change. ... Then the therapist can match up with the client and feel into the client as an entrainment. (Shea 1997)

Somatic cranial work seems to utilize aspects of Sutherland's original concepts and to focus on fluid dynamics in particular, as well as the cranial bones and membranes as they relate to what is termed 'the breath of life', with particular emphasis on using these foci as means of dealing with the effects of shock and trauma on the nervous system.

4. Sacro-occipital technique (SOT) and applied kinesiology (AK)

SOT evolved out of the work of chiropractor Major Bertrand DeJarnette (DeJarnette 1975/1978), who based his methodology on Sutherland's original osteopathic research as well as on many of his own extremely complex ideas and methods. A further evolution through chiropractic was based on the work of George Goodheart, who modified both Sutherland's and DeJarnette's work (Walther 1988). Key points are monitored on the cranium (for example) while (apparently) associated muscles are tested for strength or weakness during particular phases of the breathing cycle, with specific guidelines as to the subsequent treatment protocol being based on the outcome of these tests. A common feature of both SOT and AK is the 'asking' of certain questions of the body (i.e. 'Is this muscle testing weak or strong, under these particular conditions, while this specific point is being pressed/touched?'). This somewhat formulaic approach, which provides protocols based on the 'answers' the body gives to the questions, is extremely popular, particularly in the USA. A detailed evaluation of SOT is to be found in Chapter 5.

5. Eclectic dental and craniofacial approaches

A range of applications of cranial manipulation have been developed, largely by physiotherapists, chiropractors and dentists, to deal with dysfunction and pain involving the facial bones as well as dentally related abnormalities of the facial structures. Dental considerations and approaches (many of which lean on cranial osteopathic, craniosacral and SOT methodologies) are discussed in detail in Chapter 11. Physiotherapy and orthopedic treatment of craniofacial and craniocervical problems have avoided particular immersion in the controversial areas discussed earlier in this chapter and have adopted an eclectic and pragmatic structural/functional approach to manual treatment of congenital and acquired (whiplash, etc.) dysfunctional patterns, involving the

Box 1.3 Models which attempt to explain cranial therapeutics—*continued*

bones and soft tissues of the head and neck (Vernon 2001, von Piekartz & Bryden 2002). Some of the methods used are discussed in later chapters.

Poly-vagal concept Two different oscillations in the cardiovascular system coexist; one is associated with blood pressure variations while the other seems to relate to respiratory sinus arrhythmia (RSA - heart rate variability in response to breathing cycles).

Sahar (2001) has proposed that RSA is controlled by sympathetic and vagal influences, and that it appear to represent the state of regulation of the autonomic nervous system.

Porges (2001) argues that these blood flow oscillations express the 'ventral' vagus complex. Unlike the 'dorsal vagus' (unmyelinated and phylogenetically earlier), the myelinated ventral vagus complex is a more recent mammalian development that can rapidly regulate cardiac output. The autonomic nervous system can also be influenced by the slower Traube–Hering–Mayer waves (Sahar 2001). Cranial therapy appears to strongly modify these influences. (Nelson et al, 2001). See Ch. 4 for more on this.

Conclusion There exists a purely mechanistic cranial model (incorporating, knowingly or unknowingly, the principles of tensegrity) , as well as various modifications which focus on the 'fluid/electric' aspects of the body which range from the partly mechanistic to the almost totally 'energetic' and spiritual. The focus of this book is to attempt to make sense of the theories underpinning these approaches as well as to encourage greater incorporation, into whichever model is being used, of some additional respect for the soft and hard tissue components and functions that – in health – make up the flexible cranium.

SUMMARY

As outlined at the start of this chapter, the five elements of the cranial hypothesis which Sutherland proposed were:

1. an inherent motility of the brain and spinal cord
2. fluctuating cerebrospinal fluid
3. motility of intracranial and spinal membranes
4. mobility of the bones of the skull
5. involuntary sacral motion between the ilia.

How do these propositions stand up to examination? The evidence which will be produced and argued in the next and subsequent chapters will indicate the following.

1. Inherent motility of the brain has been proven; however, the impact of this function on cranial bone mobility is possibly less than Sutherland imagined. Its motion probably contributes towards the composite of forces/pulses which it has been suggested produce the cranial rhythmic impulse (CRI).

2. The CSF fluctuates but its role remains unclear in terms of cranial motion. Whether it helps drive the observed motion of the brain or whether its motion is a byproduct of cranial (and brain) motion remains uncertain. This fluid pulsation seems likely to be at least one factor in the CRI phenomenon.

3. The intracranial membranous structures (falx cerebri, tentorium cerebelli, etc.) are clearly important since they attach strongly to the internal skull and give shape to the venous sinuses. Dysfunction involving the cranial bones has to influence the status of these soft tissue structures which strongly attach to them, and vice versa. To what degree they influence sacral motion is debatable. They will be seen in later sections of this book to be useful in assessment and treatment protocols.

4. The bones of the skull can undoubtedly move at their sutures. Whether this capacity is simply a plasticity which allows accommodation to intra- and extracranial forces or whether the constant rhythmical motion, the CRI, drives a distinct sequence of cranial motion is debatable. The clinical implications of restrictions of the cranial articulations seem to be proven, although dispute exists as to precise implications. The 'normal' CRI rate and the significance of this also remain very much in dispute.

5. There seems to be involuntary motion of the sacrum between the ilium but the means

whereby this occurs remains unclear (or at least unproven), as does the significance of this motion in terms of cranial mechanics. It is debatable as to whether there is indeed synchronicity between cranial and sacral motion (Moran & Gibbons 2001).

In the next chapter (Ch. 2) the most important issues surrounding cranial theory and practice will be reviewed in the light of research to date.

Questions will be asked which will cover the major conundrums surrounding cranial therapy beliefs – is there cranial motion between the bones and if so, what moves the bones?

What, if anything, is the 'CRI' and is there a 'normal' range of these pulsations?

Does cranial motion induce sacral motion and vice versa, and if so, what part do reciprocal tension membranes play?

The questions will be raised and, as far as current research allows, answered. While this investigation will reveal some firm answers, a degree of confusion will undoubtedly remain, since some of the research evidence is equivocal, with documentation emerging which both supports and contradicts some of the areas of debate.

REFERENCES

Brookes D 1981 Lectures on cranial osteopathy. Thorsons, Wellingborough

Chen C, Ingber D 1999 Tensegrity and mechanoregulation: from skeleton to cytoskeleton. Osteoarthritis and Cartilage 7: 81–94

Cottam C 1956 Craniopathy workshop notes

DeJarnette B 1975/1978 Sacro-occipital (SOT) notes – compilation of 1975/1978 training manuals (self-published by the author)

Frymann V 1971 A study of rhythmic motions of the living cranium. Journal of the American Osteopathic Association 70: 928–945

Greenman P 1989 Principles of manual medicine. Williams and Wilkins, Baltimore

Greenman P, McPartland J 1995 Cranial findings and iatrogenesis from cranio-sacral manipulation in patients with traumatic brain syndrome. Journal of the American Osteopathic Association 95(3): 182–192

Ingber D 1993 Cellular tensegrity: defining new rules of biological design that govern the cytoskeleton. Journal of Cell Science 1993; 104: 613–627

McPartland J 1996 Craniosacral iatrogenesis. Journal of Bodywork and Movement Therapies October 1(1): 2–5

McPartland J, Mein E 1997 Entrainment and the cranial rhythmic impulse. Alternative Therapies in Health and Medicine 3(1): 40–44

Magoun H 1976 Osteopathy in the cranial field. Journal Printing Co., Kirksville, MO

Milne H 1995 The heart of listening. North Atlantic Press, Berkeley, CA

Moran P, Gibbons P 2001 Intraexaminer and interexaminer reliability for palpation of cranial rhythmic impulse at the head and sacrum. Journal of Manipulative Physiology and Therapeutics 24: 183–190

Nelson K et al, 2001 Cranial rhythmic impulse related to the Traube-Hering-Mayer oscillation. Journal of the American Osteopathic Association, 101(3): 163–73

Norton J 1991 Tissue pressure model for palpatory perception of CRI. Journal of the American Osteopathic Association 91: 975–994

Porges S 2001 Polyvagal theory: phylogenetic substrates of a social nervous system. International Journal of Psychophysiology 42(2): 123–146

Sahar T et al 2001 Vagal modulation of responses to mental challenge in posttraumatic stress disorder. Biological Psychiatry 49(7): 637–643

Shea M 1997 Somatic cranial work – the Sutherland approach. Shea Educational Group, Florida

Sutherland W 1939 The cranial bowl. Free Press Co., Mankato, MN

Upledger J 1995 Research supports the existence of a craniosacral system. Upledger Institute Enterprises, Palm Beach Gardens, FL

Upledger J 1996 Response to craniosacral iatrogenesis. Journal of Bodywork and Movement Therapies 1(1): 6–8

Upledger J, Vredevoogd J 1983 Craniosacral therapy. Eastland Press, Seattle

Vernon H 2001 The cranio-cervical syndrome. Butterworth Heinemann, Oxford

von Piekartz H, Bryden L 2001 Craniofacial dysfunction and pain. Butterworth Heinemann, Oxford

Walther D 1988 Applied kinesiology. SDC Systems, Pueblo, CO

Wang N, Butler JP, Inger DE 1993 Mechanotransduction across the cell surface and through the cytoskeleton. Science 260: 1124–1127.

Woods J, Woods R 1961 A physical finding related to psychiatric disorders. Journal of the American Osteopathic Association 60: 988–993