

CHAPTER 2

THE TROPIC PREMISE

Having discussed the origin and justification for the Tropic Premise, it is important to consider its consequences. In a sense it is a waymark in orthodontic history, marking the point as which the specialty changed from a genetically based science to a posturally based one. In reality the two are very different and after one hundred years of mechanically correcting genetic abnormalities, this is a shift towards examining the more basic historical and environmental causes of disrupted facial growth and creating change by correcting muscle posture and tone.

For many years some clinicians will cling to traditional concepts of orthodontic treatment with fixed appliances but slowly there will be recognition that biological problems can not be cured by mechanics. The specialty as a whole has been moving in this direction for many years with pioneers such as Slim Wallace, Westin Price, Egil Harvold, and Rolf Frankle to name a few.

Many clinicians talk of a middle way, using functional appliances to reduce an overjet and then aligning the teeth with fixed appliances, while others use free sliding mechanics to encourage bony growth. Fixed and removable light wire techniques apply gentle forces but how do they match those provided by the tongue and lips? We will talk more about vertical growth and how it can be controlled but currently there does not seem to be a treatment capable of converting vertical growth to horizontal except perhaps Orthotropics.

There are no short cuts.

We will be talking about the techniques used to achieve horizontal growth but they are difficult and time consuming and many clinicians will naturally wish to simplify them. I am constantly in contact with those who have created ingenious simpler systems of applying the Tropic Premise. I am interested

in all of them and happy to support their efforts, but rarely do I see great long-term results. The most crucial bone is the maxilla and in the long-term every one of these methods seems either to retract it or to allow it to retract, causing an inevitable increase in vertical growth.

At a rough estimate a face takes 12 to 18 years from birth to develop its characteristics and many clinicians want to correct the dental skeleton within a period of a year or so. This is unrealistic, they may be able to straighten the teeth and possibly improve the face within this period but the oral posture will always determine the long-term form. It is natural to want to take short cuts but both the clinician and patient must be aware of the mechanical and biological limits and I routinely tell dentists and patients that after the age of five changing the growth pattern of the base of the skull is inevitably a slow process, taking years not months.

As we have discussed there are many more simple ways such as, an expansion appliance to provide enough space for align the teeth, coupled with a Twin Block or Bionator followed by a fixed appliance or light-wire removable to align the teeth will often get a nice result provided the patient has reasonable muscle tone. The face will be better than before but will still look a little flat with a large nose and only the few who correct their posture spontaneously will avoid permanent retention.

It is hard to express the size of the difference between the results of three or four years of Biobloc Orthotropics and those of any other method unless one looks at the faces. Photographs establish the truth and ultimately it will be the visuals that will ensure that the public will demand it.

ORAL POSTURE.

I do want to involve oral myologists and speech therapists in this treatment. There was a lot of discussion about negative tongue pressure in the 1930s and I am interested in recent research done at Göttingen University in Germany on the theory that the mouth, the nose and airway can be considered as a series of separate compartments. However, I like simple things like the Tropic Premise because in just a few words it explains the aetiology of malocclusion as well as TMD, ENT, Apnoea and occlusion.

Years ago I did some research on intra-oral air pressure and tongue posture but the results were too varied to publish. I came to the conclusion that it is impossible to measure tongue posture over time. I am sure that is why most universities are not interested in oral posture although there many indications that it is a major contributor to skeletal form. There may not be much evidence to show that malocclusion is a postural deformity but equally there is little to show that it is inherited. Despite this 99% of the world's orthodontic treatment is done on the basis of the latter.

I began on this philosophical journey because I was not happy with the results of orthodontic treatment or the thinking behind it. I was surrounded by orthodontists who were showing me bits of evidence to support their ideas but many did not sound logical or support a cohesive theory for the aetiology of the problem. The advantage of the Tropic Premise is that when I apply it to children at a young age it so obviously fits.

One thing worries me about workers in the field of Oral Posture, is the interchange of the words Function and Posture. To me they are quite different the former being short-term force, the latter long-term position, often involving little force at all, although they work together and are hard to separate.

ORTHOTROPICS, GENETICS AND EPI-GENETICS.

Our bodies have evolved with an ability to respond to changing environments during growth, but that can't be the whole story. How can the genes achieve this? If the leg of a newt is cut off, it will regrow but if it is sutured back it will repair. How can the genes

know when to tell the proximal cells to repair the old limb or grow a new one? How are the instructions communicated? This is what many people call epi-genetics, we know that growth responds to environmental factors, we just don't know how.

Regardless of where they have come from, immature transplanted cells can recognise where they have been placed and 'know' to produce the changes required at that new site and how to convert to the tissues required. I am suggesting that the only information they need is their position within the organism. An Epi-genetic explanation suggests the creation of a control system that can tell cells how to respond in each situation and I don't think that happens. There are an almost unlimited number of possible environmental threats and the concept of epi-genetics would require the evolution of a response to each of these. What evidence is there that such a system exists?

For instance if the mouth of any human is left open because of nasal obstruction or nerve paralysis the mandible slides down between the fasciae of the neighbouring tissues and this is followed by a change of shape. The Vertical Ramus tilts, and the gonial angle flattens. This requires complex cellular activity to achieve the specific and constant pattern of change that occurs although no force is applied. How is it stimulated and what controls it? Interestingly there is little change in the area of the chin but of course the cells here have not changed their relationship with their neighbours who have moved with them. Isn't it more simple to conclude that the individual cells in the periosteum and periodontal membrane appreciate their position has changed and set about restoring the shape as best they can in accordance with their 'plan' but the cells between the chin and the Vertical Ramus have a problem and this results in the anti-gonial notch.

We should consider what guides the incisors of a crocodile which may have two meters of tissue between them, because it would be fatal if they did not meet perfectly; a powerful evolutionary force. Work with identical twins shows that the changes in the direction of facial growth, causes alterations in the maxilla and mandible proportionally greater than any other bone in the human

body. Could we postulate, perhaps, that the genetic control of these areas is intentionally less absolute, thus allowing the 'tropic' factors greater influence in establishing the final articulation? If so, any adjusting mechanism would have to be extremely delicate; and sensitive to the gentle forces generated when the jaws are held in the correct position. This is the basis of the Tropic Premise.

There is an underlying logic to this thought which would enable us to blame nature – not for her imperfect control of growth but for leaving the system so delicate that a thrusting tongue might tilt a maxilla or a trapped lip retrude a mandible". I was about to say that this is 'new thinking' but in fact I put it forward in the early 1970's.

Skull Form.

The longer I cogitate the more convinced I am that the maxilla is the key bone in the orthodontic field. The environmental changes of the last 50,000 years have resulted in many human maxillas being retruded by twenty or thirty millimetres, a huge amount in relative terms, which in turn has messed up the internal cranial bones as well as the jaws and face.

By chance there are the remains of a Stone Age settlement beside my house and we have found a couple of axe heads circa 5000 years old in the area. I think the ancient Brits were a little backward in developing agriculture and metal working, certainly compared with the early pre-Sumerian civilizations. Whimsically I visualise my ancient neighbours as looking rather like us but with forward growing faces and broad arches. I am sure that their burial grounds are near-by but sadly we can only guess their facial form.

An absence of well preserved skulls from 20,000 years ago makes it difficult to assess what their skull form might have been. My colleague Robert Corruccini the well known anthropologist from Carbondale Illinois, has spent a long time searching for good lateral profiles of evolutionarily normal lateral cephalograms but to give an idea of the problem he "found little of use in fossils and their descriptions (deformation, fragmentary problems). Indeed the best series of such radiographs is for the "Peking Man" Homo

erectus calvariae in the monograph by Weidenreich, but these all lack faces (more easily broken off during fossilization) so aside from estimated basion - sella turcica - nasion angle (flexion) there is little of use for establishing norms". However he continues "not everyone would agree that Homo erectus was fully human or that the species should be used in any way to judge what is evolutionarily normal for anatomically modern "man."

EVOLUTION OF EUROPEAN MAN.

There is considerable evidence to suggest that around 20,000 years ago a version of modern Homo Sapiens that for convenience, we might call Anglo-Saxon, was pushing across Northern Europe. He was fair skinned with blond hair and taller than previous humans. He was clearly successful in that he was able to thrive in the harsh climatic conditions of the various ice ages, probably retreating South during their peaks and returning North during the milder intervals.

The last of the several ice ages terminated about 30,000 years ago and following this, the Anglo-Saxons appear to have expanded progressively over central Europe before spreading West and North. Genetic studies (Sykes 2001) suggest that this entire population started as one family group and on this basis, one could conjecture that the present countries of Northern Europe were initially founded by single couples.

Since 20,000 years ago it would seem that this new subgroup progressively displaced the previous diverse population of Neanderthal and related groups. Frayer (1978 Page 134) found that. "Early Upper Paleolithic groups are consistently more variable for nearly every dimension than either the Late Upper Paleolithic or Mesolithic sample" and Sykes suggested that the genes of this modern sub-group, then and now (a mere 750 generations later) are very uniform. This is highly suggestive of one species taking over from, or more likely eliminating a range of predecessors and as such, one would expect that present Anglo-Saxon descendants would have a very similar gene pool and bone structure.

GENETIC VARIATION AND CONTROL

Interestingly as we will discuss later, there is considerable variation in the growth of the facial bones of modern man, proportionately more so than in other parts of the skeleton. Despite this the majority of dentists and orthodontists still believe these variations are genetic but looking at our unified genetic base I find this very surprising.

Regardless of the influence of the environment we need to consider how growth is modulated by the genes. Clearly this is important if we wish to influence growth at all. We know from the work of John Gurdon the Cambridge Nobel prize winner (1966), that most human cells contain a genetic map of the whole body. Many years ago I put forward the The Cell Volition Premise (Mew 1986) saying, "Each cell in the body is endowed with the information necessary to control the detailed growth, development and activity of every other cell. Supplied with this information, it requires only positional information from neighbouring cells to multiply, specialise or act as the situation requires under its own volition." Human cells establish communication with their neighbours via 'gap junctions' to perform the tasks required in their locality. If this hypothesis is true then we must accept that growth is largely controlled by the individual cells in each part of the body.

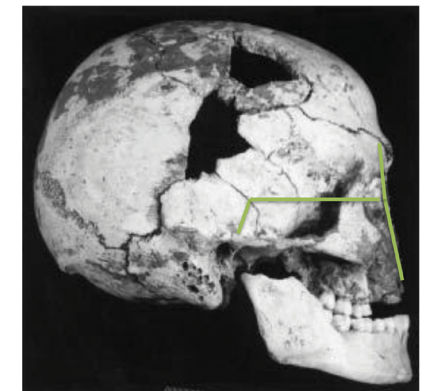
There are several other theories most of which were mentioned in the last chapter but I can see no sign of any nervous, hormonal or other extra-cellular control system. It would need to deliver and receive detailed information in order to exercise control of cellular growth. To justify such a theory there would have to be some sign of such a system responding to various epi-genetic influences in a way that explains the responses that we know occur. This question has been buffeted about for the last 3,000 years and I suspect that the absence of a firm reply has been the result of emotion rather than lack of logic. Many workers who have analyzed and described fossils from this period have noted the general cranial resemblance to contemporary Australian Aborigines. On this basis Corruccini suggests that our current maxillary position may be 20 millimetres retruded. While I am quite happy to accept

that Native Australians were similar, I worry that this is opinion based. Twenty millimetres in relative terms is a large amount but without good skeletal material we will never know for sure. I have also collected lateral skull images of some Stone Age Asian (Japanese) skulls. They too were a little behind with agriculture and had their maxillae placed further forward but here I worry about Neanderthal influence

Perhaps the best we can do is to put up a hypothesis and leave it for someone else to revise/condemn.

I believe that the specialty has been misled by the previous speculations of Steiner. He created a hypothetical profile based on limited modern material suggesting that an SNA of 81 degrees was near ideal. I think we need a more prognathic version to aim for, based on our ancestor of 20,000 years ago, so called Palaeolithic Man. As I have just said most skulls from this period have been severely damaged but I am also concerned that nearly all of them had receding Frontal bones and chins. I was therefore particularly interested in some Mesolithic remains found in Gough's cave in Somerset, England (see figure II/1), dating from around 11,000 years old. These had obvious chins and firm foreheads.

Unfortunately bronze axes were also found at the site suggesting their lifestyle was considerably advanced compared with their Palaeolithic forebearers but as can be seen the skulls were much more like those of modern civilised man. The only obvious difference



Mesolithic skull from Gough's Cave circa 11,000 years ago. Superimposed with Orthotropic base lines.

Fig. II/1

being the prognathic facial bones (see figure II/1).

Based on this skull and using my knowledge of the contrasts between prognathic and retrusive faces, I constructed a hypothetical profile that I thought represented Stone Age man (see figure II/2). I have added some reference lines and a comparison with Steiner's SNA and McNamara's Nasion Vertical.

Clinicians like guidance and especially consensus guidance and I think we need to encourage a move towards a more protrusive human profile. Too much of current treatment is retractive because of Steiner's mistaken hypothesis and there is plenty of evidence to suggest that good looking profiles have substantially more horizontal growth and I hope that the outline in figure II/2 will become accepted as a good guide.

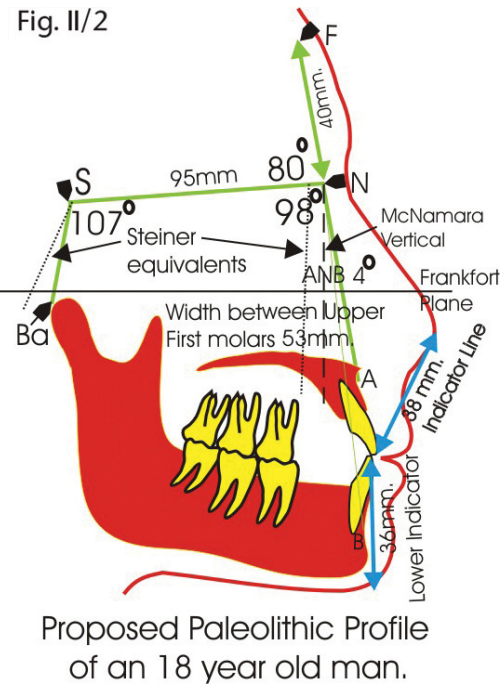
Cranial Distortion.

I did some research on measuring tongue to palate posture in the late 1960s and found like many other researchers that negative pressure is essential for swallowing. This led me on to explore how this can be achieved by children who posture their tongue between the teeth rather than against the palate. From my more recent assessments this group is probably over 95% of children and adults in industrialised society; a remarkable proportion, but of course few of them have 32 teeth in full function with ten millimetres of spare space behind the wisdom teeth which is my concept of correct occlusion.

I found that these patients create a seal by pressing the borders of their tongue against the teeth and sucking. However most of them also have to contract the buccinator against the teeth in order to prevent the ingress of air between the teeth. This results in a visible contraction of the cheeks and lips every time they swallow which enables me to recognise a tongue-between-tooth swallow by external observation. Another visible feature is the enlargement of the cheeks. While this is natural for suckling children it should disappear once the adult tongue-to-palate swallow has developed between the age of nine to eighteen months or whenever. If a correct tongue-to-palate swallow develops then the dental arches widen to suit the

tongue and the cheeks become hollow as they are with nearly all top fashion models. If they continue to swallow with their tongue-between-their-teeth then they develop jowls and often a class II/2 occlusion malocclusion.

I tried and failed to find experimental evidence to support these conclusions but have found that a panel of five or even three judges can quickly be trained to recognise faulty swallows, muscle tone, lip seal etc and of course their 'opinions' can be combined to become scientific fact. I have run out of time on this one but would be happy to support any reader with research of this



type. To me it is the only way to research oral posture and come out with clear facts. We still need to find out when the infantile tongue-between-gum-pad 'suckling' swallow naturally changes to the adult 'sucking' swallow, I believe 15 months but it could depend on many environmental factors and I have heard different opinions but it would seem most natural to me if a tongue to palate swallow developed as the buccal teeth erupt. These postural issues will be discussed further in Chapter IV.

However the Tropic Premise remains the

same, if the teeth are in light contact for four to eight hours they will all meet evenly without premature contacts or slides. If the muscle tone is good the maxilla and mandible will be placed forward with broad horse shoe shaped arch forms and over 50 millimetres between the lingual surfaces of the upper first molars. Coupled with this there will be an excellent airway and few if any Ear Nose and Throat or Temporo Mandibular problems. Make this the objective of your professional career and you will provide much good.

Most experienced Orthotropic clinicians realise that success depends on correcting the oral posture, but it is not easy to monitor one's own success. Here I quote from Dr Bill Hang a well-known orthodontist on this subject.

"There is no question that these patients have better bite relationships following Orthotropics. I've been a big fan of face mask therapy for kids like this since 1984 when I heard Henri Petit in Hartford, CT advocating face masks. My thoughts got a whole lot more refined in 1990 when I met John Mew. Petit never discussed oral rest posture or why the problem occurred. I quickly scanned this article to see if there was any mention of poor oral rest posture and efforts to improve it. What John helped me understand is that

the oral posture must get corrected if the correction is to remain stable. As the years have gone by I know that he is correct. I often shake my head when I have a realization that John is virtually always right on these things. Some of these cases will be stable, and others will not. My experience tells me that this patient will not maintain that bite as long as his airway is so compromised".

"There is nothing like looking at the pre-treatment and post-treatment ceph tracings to make me appreciate what I've learned from John Mew. If one looks at the growth vector of the lower jaw it is often almost entirely vertical with little or no forward movement. Some would say that is a good thing since they are Class III. I disagree. I really don't want to see a vertical growth direction since it is less esthetic and only complicates efforts to get the lips together at rest. This is where John's magic of idealizing the position of the upper incisors, intruding the 6's, reducing the face height and getting a forward rotation of the mandible is such a plus. It is more work, but it increases the chances that the patient can achieve a proper oral posture at rest, providing future stability".

BELIEF.



First Generation of Western Life Style. Note the upper jaw is slightly back

Second Generation of Western Life Style. Note the lower jaw is also back and the cheeks are enlarged

Third Generation of Western Life Style. His cheeks are further enlarged, and his jaw is so far back that he has been told "only major surgery can correct it".

After two years Orthotropics. The jaw is growing forward to its correct position.

Fig. II/3

The biggest problem I have had in introducing Orthotropics has been with those Orthodontists who are certain that the Tropic Premise cannot be true. No amount of evidence seems to convince them and they are often very suspicious of any evidence I provide. Basically they think that every malocclusion is inherited and will not accept that our direct ancestors had virtually perfect occlusions. This is why I felt I needed to write this second book to re-enforce the opinions which to me were so obvious.

For Instance I was recently asked to treat a nine year old boy of Indian descent who had been diagnosed as having Micrognathia. He had been told he would need surgery when he was about eighteen years old. Both his Father and Mother were leading dentists in the area and when they were busy, the boy was often brought to see us by his Grandfather who had come to England as a young man. He was well educated and we had many interesting discussions.

I could see a progressive reduction in the forward dento-facial growth in the three generations and asked if I could take some photographs to record this. They kindly gave their approval and the paste up is displayed in Figure II/3. The boy has been a good patient and we first moved his maxilla forward before encouraging the mandible to come forward by training him to close his mouth in a forward position. Provided he continues to be so within another year we should have cured his micrognathia for life although we will ask him to continue at night until he has stopped growing.

This has been a short chapter to emphasise the absolute need to create a correct Tropic Posture and also the contrast between Orthotropics and almost all current methods of orthodontics.

References.

Fraye D W. 1978. Evolution of the dentition in Upper Paleolithic and Mesolithic Europe. University of Kansas. Publications in Anthropology.

Gurdon, J.B. "Fertile" Intestinal Nuclei Nature 210. 1240-1241. 1966.

Mew JRC "Biobloc Therapy". 1986
Published by the author Braylsham

Castle Heathfield, Sussex, TN21 8TY. UK.
Sykes B. 2001. The Seven Daughters of Eve.
Bantan Press.