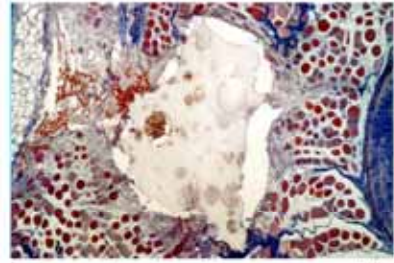
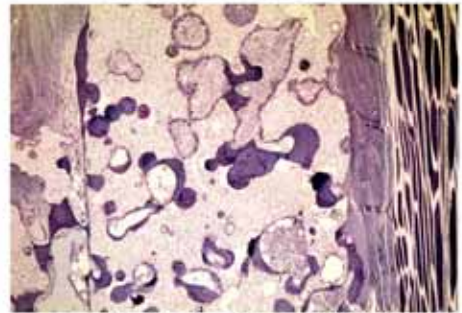




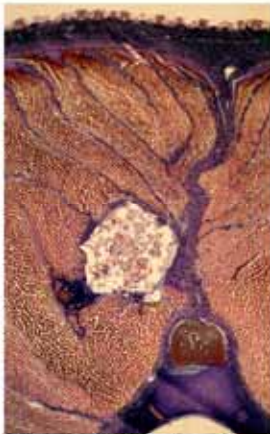
Porous sintered HA filled in prepared pulpal cavity of human wisdom tooth



Hemopoiesis in porous HA in Cyclostomata



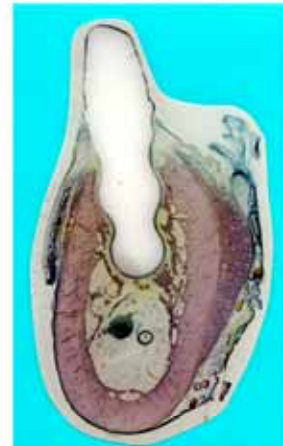
Hemopoiesis of ABMC in monkey



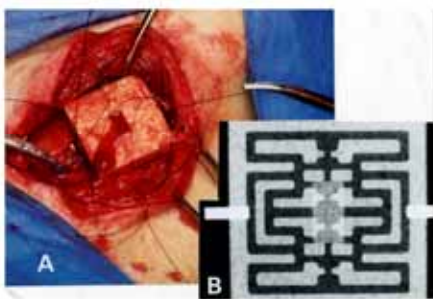
Hemopoiesis in shark muscle



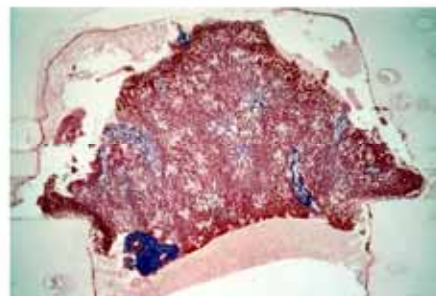
ABMC in monkey muscle



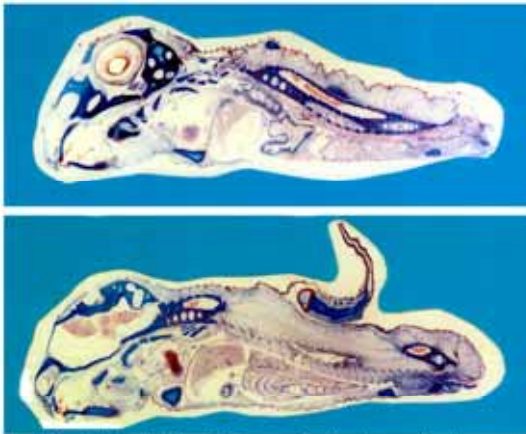
AR in dog jawbone



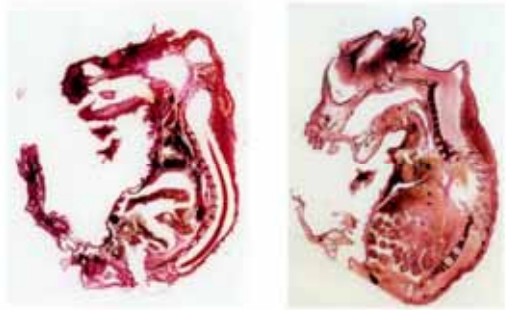
HA organ culture chamber



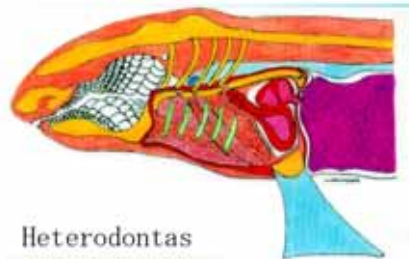
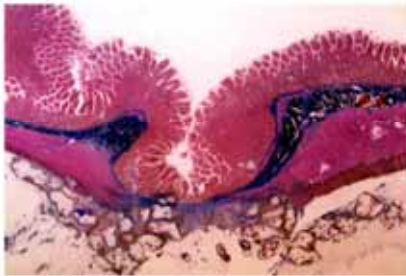
Dog liver cultured in chamber 3m postop



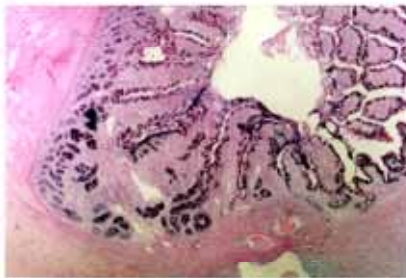
Sagittal Section of Heterodontas



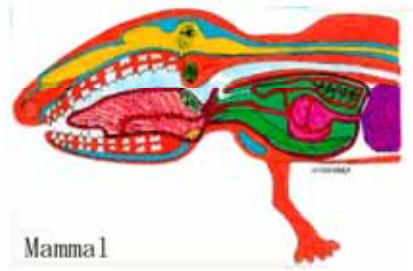
Sagittal Section of Rattus embryo and fetus



Heterodontas



Xenotransplantation of shark intestine into that of dog



Mammal



Mitochondria



AR on dog jawbone

Physiological deformity and biomechanics

Katsunari Nishihara, DMsc. DMD.

NISHIHARA INSTITUTE

HARA Bldg. 3F, 6-2-5 Roppongi, Minatoku, Tokyo.

Physiological deformity, namely facial as well as postural deformity is based on a time-dependent transformation of skeletons by means of gravity energy. The human body is constructed with various visceral as well as somato organs and a mechanical skeletal supportive system. In higher animals, there are five major correlations between organs and skeletal structures:

- 1) The central nervous system, - a correlation between the cellular membranous system of the endo-and ectoderm and the muscular system,
- 2) The autonomous nervous system, - a correlation between the ectoderm and the visceral as well as somato organs by capillaries,
- 3) The medium system, - hormones and cytokines in the blood and lympho system,
- 4) The cellular respiration system, - a correlation between intracellular mitochondria and other cells through a medium, and
- 5) The biomechanical energy system due to the gravity of the earth and moon.

Through these five systems, human body morphology is controlled. In this paper the author examines only the defining biomechanics.

Concerning the human body, major biomechanical stimuli affecting the structure of the face and vertebrae, including iliac bone, as well as the legs and arms are categorized by three major habitual behaviors, i.e., mouth breathing, unilateral mastication, and lateral or lay-on stomach sleeping habits. These three have a chain reaction not only to each other, but also to resting one's head in one's hands and shoulder handbag habits. Through these complicated habitual behaviors, the skeletal morphology of the human body gradually changes by the gravitational action of the earth.

Traditionally, in life sciences, energy has been overlooked. Therefore, major causes of not only physiological deformity, but chronic fatigue syndrome and immune diseases, are also overlooked. Life is the remodeling system of a part or the whole cell or

organism in conjugation with energy metabolism, upon which various kinds of external energies have an influence, for example, the energy of the sun, earth and moon, i.e., the constructives of the galaxy. Facial and postural deformity occur under the influence of various kinds of energy. However, the major energy is gravity. But what is gravity energy? Quitesentially, the cosmos comprises space, time, substance with mass, gravitational and magnetic force, and electromagnetic-thermodynamic energy.

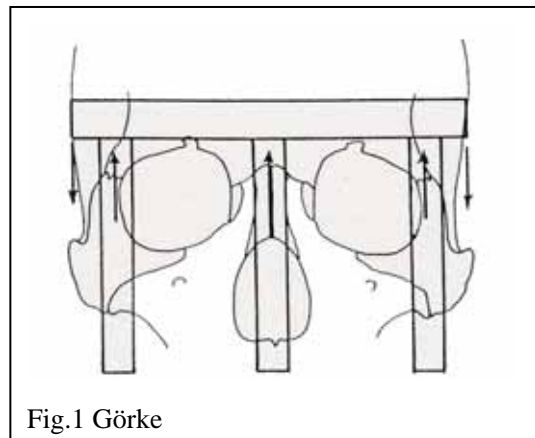
Gravitational and magnetic forces exclusively belong to and act on substances with mass and have no action on electro-magnetic energy.

Energy functions in conjunction with time. On the other hand, solid substances with mass have no time dependent function, unless they take on energy from the surrounding environment.

Substances with mass have three kinds of states: solid, liquid and vapor. Under certain conditions the vapor state can change to energy without mass over time. Even substances with mass e.g., liquid and vapor are already time-dependent because their condition receives thermal energy and their molecular particles move until they reach their limit: -273.13 (absolute zero). Gravitational energy effectively acts on the liquid state of all substances. All organisms are constructed with water-soluble colloids of organic substances, even the skeletal osseous tissue.

Famous historical studies of facial morphology have been carried out by the following researchers. Their schemata of constructive biomechanics is also presented below.

- 1) Görke (1904) Fig.1
- 2) Richter (1920) Fig.2
- 3) Benninghoff (1925) Fig.3
- 4) Bluntschli (1926) Fig.4
- 5) Sicher and Tandler (1928) Fig.5
- 6) Endo (1966) Fig.6



There are also famous histological studies of skeletal shapes known as Wolff's Law of functional adaptation of bone morphology. However, this law is restricted to very narrow conditions and over use of the constant bias function results in discrepancies of shape and function. Famous clinical examples are temporomandibular joint dysfunctions by unilateral mastication and knee and hip joint disorders of marathoners from poor running posture habits.

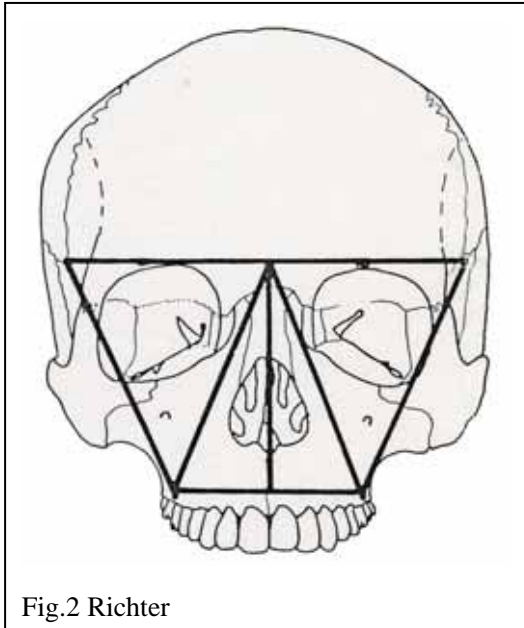


Fig.2 Richter

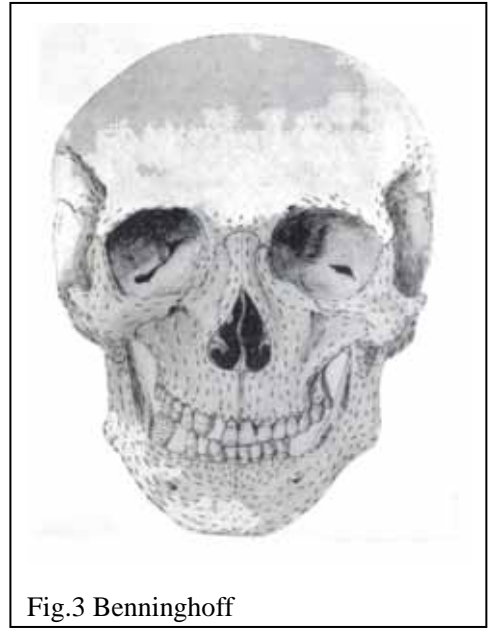


Fig.3 Benninghoff

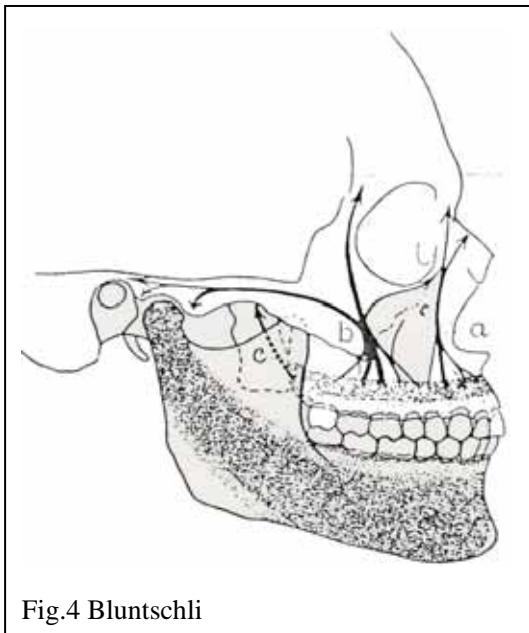


Fig.4 Bluntschli

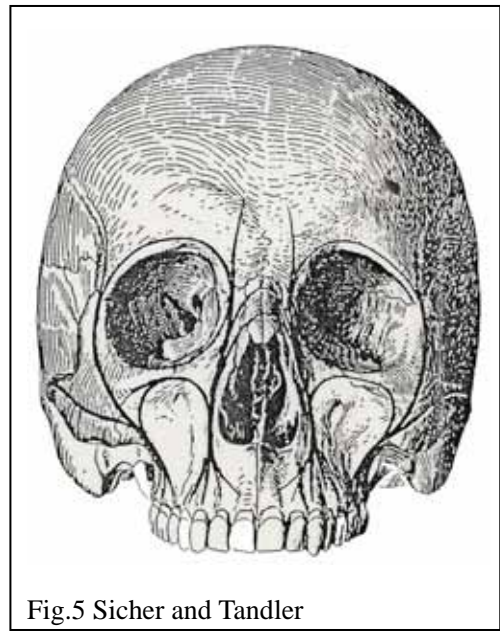
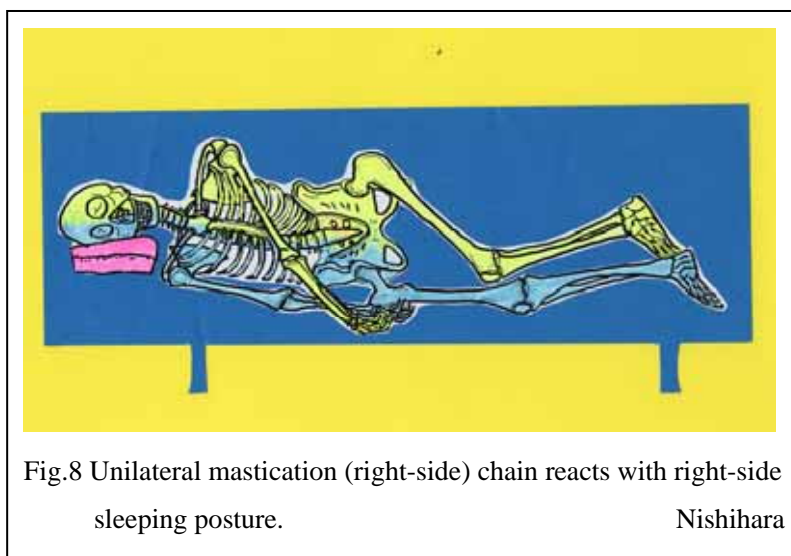
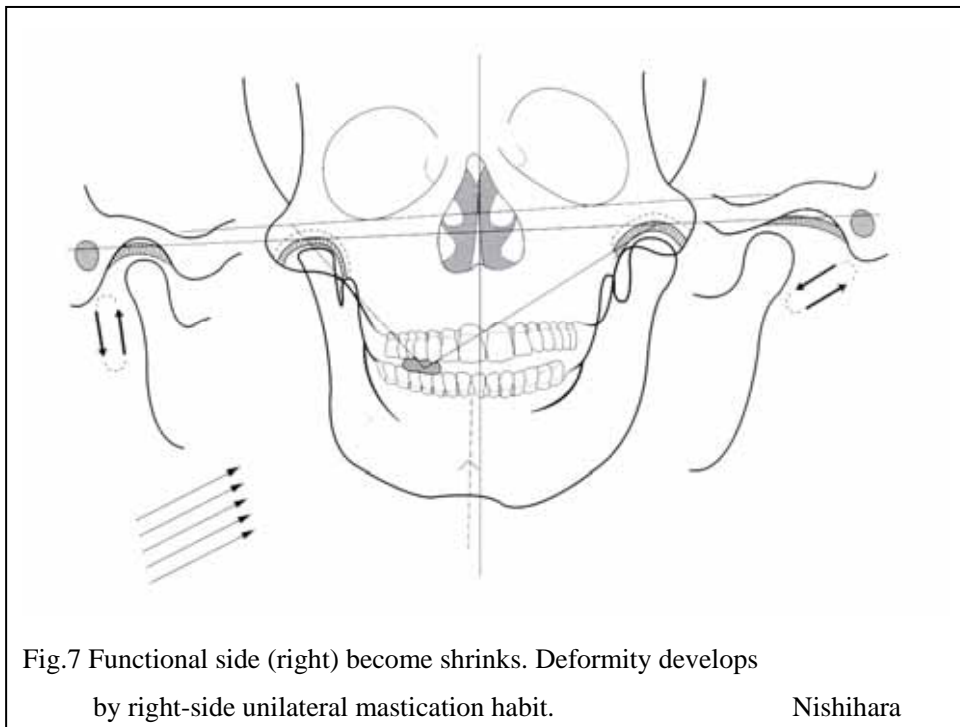


Fig.5 Sicher and Tandler

Lamarck proposed in 1809 the Use and Disuse theory for animal evolution. Wolff's Law is a part of Lamarck's theory instructed only by skeletal morphology within one generation. Lamarck's theory has important limiting conditions of use, namely not to go beyond growth and welfare conditions. If animals use organs or skeletal systems beyond their limits, functional disorders occur. Morphologies induce deformities and those of metabolism induce immune diseases. Applying Wolff's Law to the maxillo-mandibular bone, the functional side shrinks and the jaw without chewing

diseases occur. The mouth breathing habit began with the ability to speak, some 6 million years ago. This mechanism was explained by Lamarck’s Use and Disuse theory of transformation of the construction and morphology of the tongue, throat and oral cavity. The second cause of deformity is brought about by unilateral mastication. This habit is acquired by raising neonatal babies and infants. The definition of mammals is “animal, born with the suckling system which later on changes into the mastication apparatus. Suckling and masticatory muscles are derived from the branchial respiratory gut’s smooth muscles.”



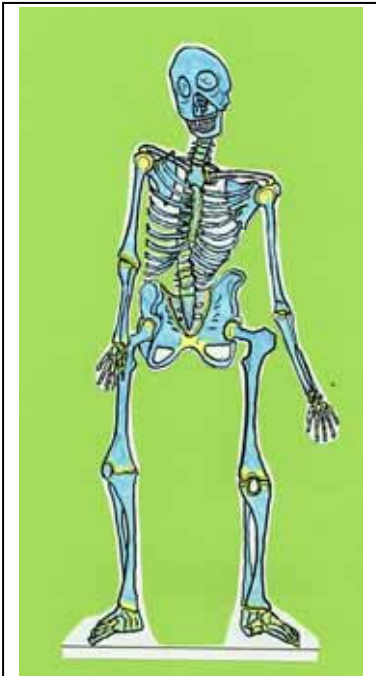


Fig.9 Standing posture of a person with trilateral habits.

Nishihara

Therefore human infants suckle and adults masticate with respiratory muscles. This is most important for mammals. Humans, eat and suckle during respiration as well as respire during eating and suckling. The failure of orthodox suckling leads infants to adopt the unilateral mastication habit. In addition, too early feeding of foods by infants, especially proteins, lead infants later on to grow up with atopic dermatitis, autism, epilepsy, and food anaphylaxis.

The unilateral mastication habit chain reacts with sleeping posture habits.

Laying on the stomach and the lateral sleeping posture cannot be corrected easily. Also, both sleeping posture habits lead to nostril closure by congestion; therefore, the mouth breathing habit begins as a chain reaction.

As a result of these incorrect sleeping postures, skeletal deformities, namely hunchback and lateral

scoliosis, pelvic bone deformity, knee dysfunction and arm tenovaginitis as well as facial deformities occur. Facial deformity is led by unilateral mastication, a habit which makes the facial shape asymmetric (Nishihara Fig.7), and, chain reacts with the lateral sleeping posture habit (Fig.8), thereby causing lateral scoliosis (Fig.9). All of the above-mentioned major behavior habits impact facial as well as body skeletal deformity. Facial and body deformities take place concomitantly by these complicated chain reactive habits. Therefore, orthopedic treatment and exercises have to be integrated with the entire body.

Orthodontic treatment has to be executed with the integrated cure of these habitual behaviors.

Unilateral energy and different movements of temporomandibular joints result in different moving shapes of mandibular chondyles. Ultimately, joints without function are created. This habit chain reacts with the unilateral sleeping posture habit, and from this, the facial skeleton as well as the tooth arch suffer distortion. Because of the human's heavy head (weighing some 5000g), a tooth or a part of a zygomatic bone can be subjected to 70~200g, or 2~10 times more than the normal force for orthodontic use. From this research on human health maintenance, the following are critically important:

- 1) Always breathe through the nostrils, never through the mouth

- 2) Masticate using both sides the mouth 30~40 times
- 3) Never drink cold water or eat ice cream
- 4) Always sleep on you back, and
- 5) Use down-soft pillow.

At the initial stage of human evolution, Pitecus (man-like ape) by learning to sleep on their back evolved into Tropus (Archeo-man), which learned to stand upright (biped) as well as speak. If we ever forget correct health maintenance, physical deformities as well as human characteristic intractable immune diseases will be waiting for us.

REFERENCES

Görke, O.: Beitrag zur funktionellen Gestaltung des Schädels bei den Anthropomorphen und Mensechen durch Unteruchung mit Röntgenstrahlen. Arch. Anthropol., NF. 1 : 91~108, 1904.

Richter, W.: Der Obergesichtsscädel des Menschen als Gebissturm, eine statische Kunstwerk. Arch. D. Mschr. Zahnhlkd., Jhg. 38 : 49~68, 1920.

Benninghoff, A.: Spaltlinien am Knochen. Eine Methode zur Ermittlung der Architektur platter Knochen. Anat. Anz., 60 (Erghft) : 189~206, 1925.

Bluntschli, H.: Rückwirkung des Kieferapparatus auf den Gesamtschädel. Zahnarztl. Orthoped., Jhg. 18 : 57~79, 1926.

Sicher, H., Tandler, J.: Anatomie für Zahnärtete, Wien, 1928.

Endo, B.: A biomechanical study of the human facial skeleton by means of strain-sensitive lacquer. Folia Anat. Jpn., 42 : 205~217, 1966b.

Lamarck J. B. PA (1809) Philosophie Zoologique, France

Wolff, J. (1870). Ueber die innere Architectur der Knochen und ihre Bedeutung für die Frage vom Knochenwachstum, Archive für pathologische Anatomie und Physiologie und für Klinische Medizin, Virchövs Archiv 50, 389-453.

Nishihara K. : Oral and Maxillo – Facial Diseases and Biomechanics – New paradigm for oral medicine, Ishiyaku Publishing, Tokyo, 2000.

Nishihara K. : Science of the face, Upfront, UK, 2002.