4. Development of Revolutionizing Gompholic Artificial Root by Means of Biomechanical Energy.

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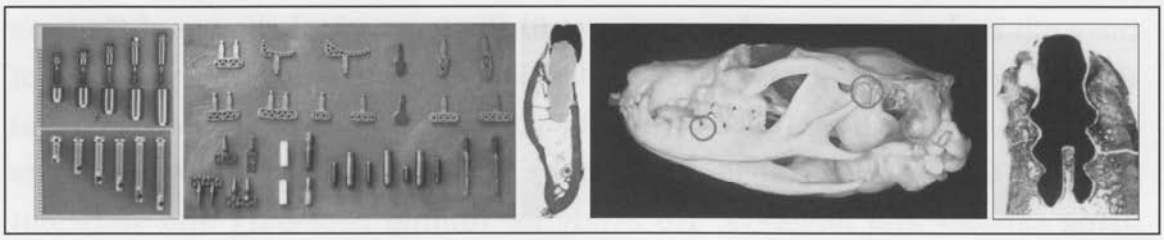
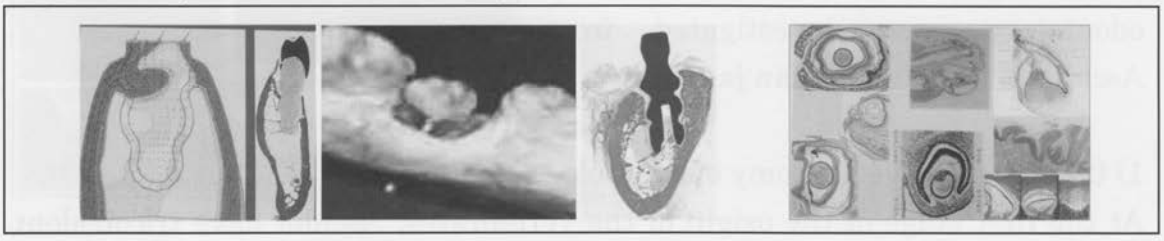
Conventional research on dental implants completely lack odontology and biomechanics as well. Before starting developmental research we have to understand the following: What is the tooth? What is the biomechanical difference between the ankylotic and gompholic system? And what is the articulation joint system?



The gompholic tooth is a sensory organ and a vehicle of masticatory force. The ankylotic tooth has no joint ligaments so does not function as a sensory organ but for prehension only. All biomechanical stimuli (forces) affecting the animal body are converted into hydromechanics.



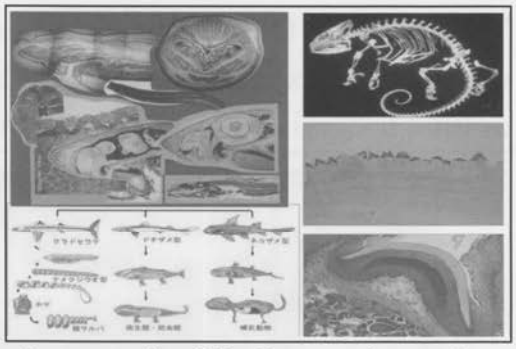
For effective bone remodeling, conversion of force into hydrodynamic flow in animal body is inevitable. Gompholic articulation is the conversion system of multiple masticatory forces into hydrodynamic flow, which evokes streaming potential concomitantly. Fixtures have no conversion system, therefore occlusal force induces bone demineralization.

All teeth are constructed with ectodermal and mesodermal hard tissue and ligaments. Therefore, the tooth system is similar to a common sensory organ or hormonal gland, just like the eye, brain, hypophysis, and epinephros.

Today, no one knows the method to develop an artificial gompholic

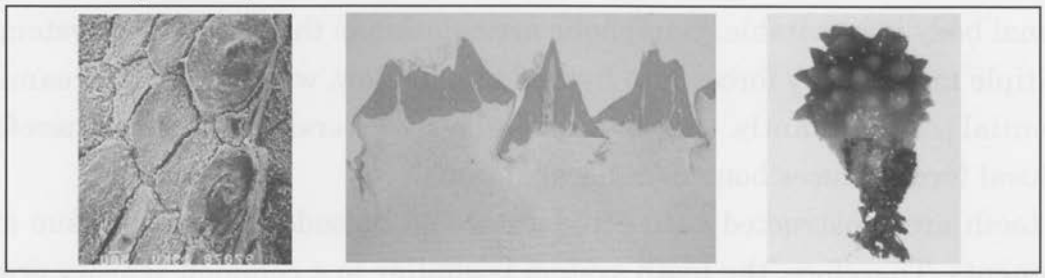
mammalian tooth instead of a dental implant. To investigate methodology to develop a gompholic artificial dental tooth, the authors carried out radical research integrating odontology, biomechanics, molecular genetics, phylogeny, as well as ontogeny, and biomechanism of evolution, which is based on earth. The basic concept for developing the gompholic artificial dental root is presented here.

Developing a gompholic artificial dental root the following synthetic integrating studies were carried out: Studies on **1)** comparative anatomy for odontology; **2)** Butler's field theory as biomechanics; **3)** Sympson's concept of the mammalian molar shape, as morphology; **4)** Relationships between the tooth morphology and species-specific feeding habits; **5)** Developmental research on bone marrow hemopoiesis; **6)** Phylogenetical change of Gaupp's theory, i.e., the auditory ossicles developed from articulatory bones of branchial arch; **7)** Research on what the gompholic tooth is; **8)** Biomechanical research on the artificial dental root by via FEA; **9)** Animal experiments using canines and monkeys, **10)** Study for finding necessary and sufficient conditions for artificial dental root therapeutics.

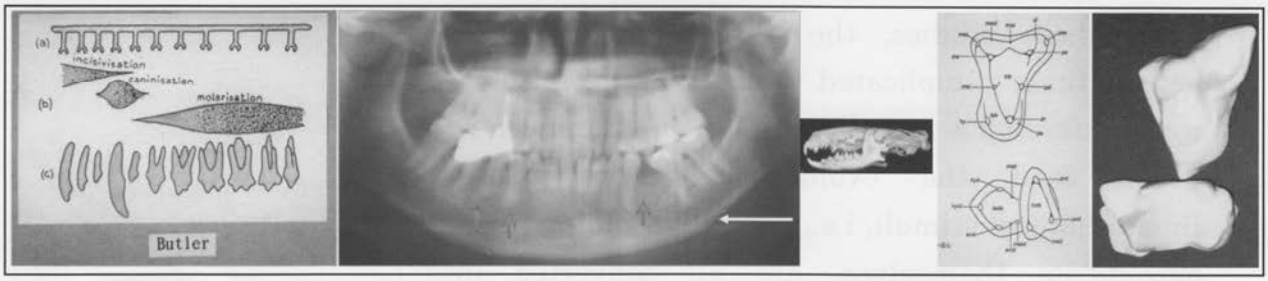


1) (1) Studies on comparative anatomy as well as phylogeny concerning odontology were investigated from Ascidia to the Mammalian jawbone.

1) (2) Comparative anatomy of odontolog
At the first stage of the origin of the vertebrates, Ascidia have triconodont type cartilagenous placoids.

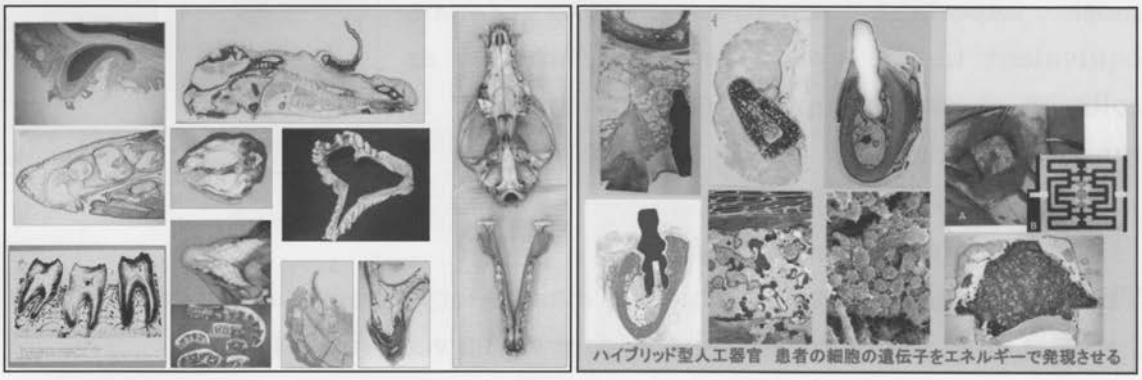


2) Butler's field theory was investigated biomechanically as flow dynamics of blood vessels around the tooth germ in embryo-stage.
Clinically, early extraction of a second premilar (↑) has caused widening of the first molar roots.



3) Simpson's concept of the mammalian tribosphenic-tritubercular molar system, was studied morphologically as an optimization response to biomechanical specific feeding characteristics. This means mammals had evolved from a sole species.

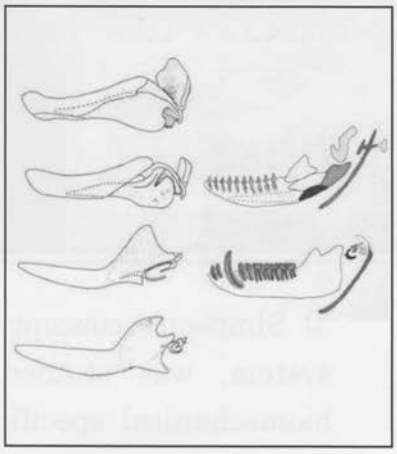
4) The relationship between tooth shape and species-specific feeding habits. This means optimization of tooth shape corresponds biomechanically to species-specific food.



5) Evolution of bone marrow hemopoiesis was disclosed by development of an artificial bone marrow chamber, which can be derived by gene expression of mesenchymal cells by biomechanical stimuli.
The topological streaming potential system works for biomechanical morphological change, against gravity energy in blood and in muscles and skeletal bones of the hydrodynamic system.

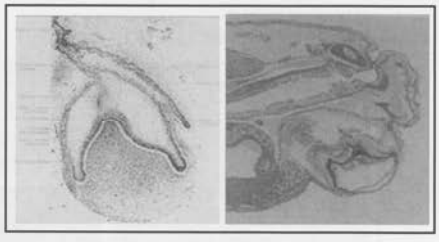
6) Gaupp's theory, namely the evolution of auditory ossicle from articulatory bone of first branchial cartilage, is disclosed to be biomechanical response to mammalian masticatory movement. This means optimization of articular bone during the function of masticatory apparatus, which resembles the functional adaptation law of Wolff in the skeletal system.

From these studies, the authors disclosed that behind these complicated theories and concepts as well as developments, there are biomechanic energy, which lead the evolution of the species. Biomechanical stimuli, i.e., energy, including animal movements themselves, are all converted into hydromechanics concomitant with streaming potential, which trigger gene expression of mesenchymal cells. Consequently, skeletal morphology changes according to habitual repeated biomechanical stimuli.



7) (1)What is a gompholic tooth?

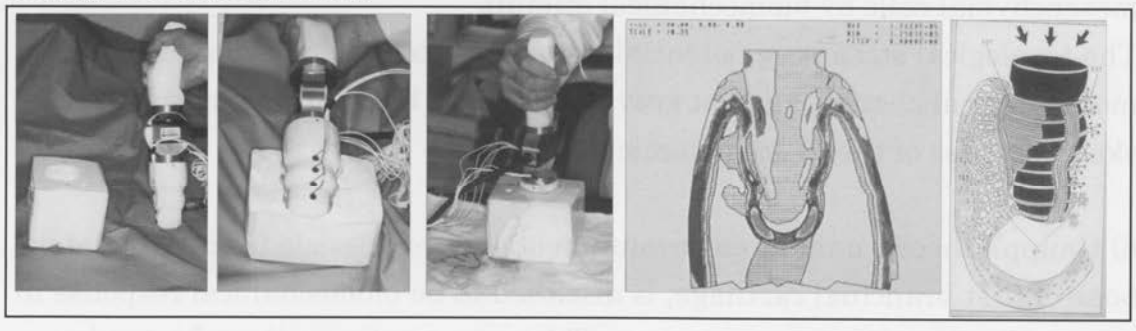
From the standpoint of phylogeny the tooth is the most important sensitive sensory organ, equivalent to the eyes. Tooth can function as collision between upper and lower jaw to masticate foods.



7) (2)What is a gompholic tooth?

The mammalian tooth is a vehicle of masticatory force, which bears multiple forces of mastication by root shape, converting vectors at the root.

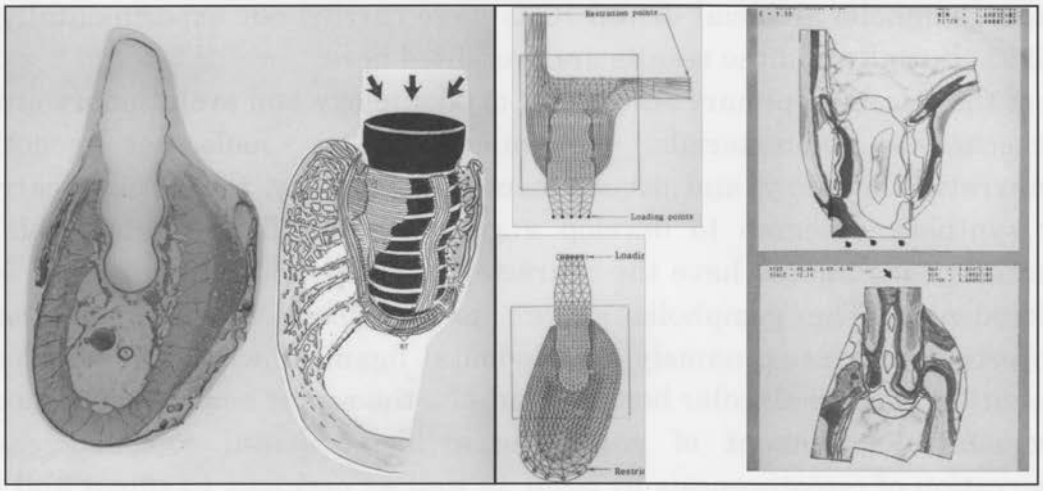
surface to hydromechanics by periroot fibrous ligaments. The mammalian tooth has periodontal ligaments, the alveolar bone proper, and fibrous cement bone, around which hemopoiesis can be induced in bone marrow during occlusal function.



7) (3) The periodontal supportive system, i.e., the articulation system, is most important for masticatory function, and hemopoiesis in bone marrow, which is the converting system of vectors to the principal stress trajectories.

At the root surface the vectors are converted to three-dimensional principal stress trajectories, which in the animal body correspond to hydromechanics concomitant with streaming potential.

8) Biomechanical research using FEA on a buccal-lingual section model of a mandible and maxilla, was carried out. Results showed biomechanical relations between jawbone and tooth root shape.



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