

Implant Retention (With introduction to Particle Physics)

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ABSTRACT

For the implant to be bonded, added to the tiny area for adaptation, there is none other than the electric and magnetic forces in the oppositely charged IONS for the IONIC-BONDING deep beyond the superficial surface.

KEYWORDS

compound, complex, adhesion, chelation, ions, electron, elementary particles, quarks, leptons, photons, God Particle, Higgs Field, atom, chelators, matrix.

One element may be bond to another by reaction into a "Compound" ($2H + O \rightarrow H_2O$), both elements being changed.

In the implant and tissue there are no changes in any of their constituent elements however entangled and dissolved one in another. There is no chemical reaction in the resultant "Complex".

Between the implant and the tissue the bonding forces may be mechanical (by adaptation) or

electrical (by adhesion or chelation), predominantly by one, or in combination.

By roughening the implant body, promoted adaptation is simple understanding. Increased surface area by roughening or by any other means such as by blasting, beading, pitting or etching also affords for broader adhesion and chelation.

"CHELATION" is an ionic bonding which should be interpreted.

"Ions" (called by Faraday) are electrically charged particles which may be contained of one or group of atoms. Normally the atoms are neutral. An ion becomes charged because it has lost or gained one or more electrons. The electron being negatively charged an ion may be thus charged positively (cat-ion) or negatively (an-ion).

The electric source in the tissues comes from changes in position of electrolytes (Na, K, Ca) in different cells with different chemical compositions.

The electric current plays an integral role in normal body functions, serves as a guide in development of the embryo and regeneration of tissue including bone.

Ions being charged atoms, what an atom is should be briefly explained. Everything in the universe, fish, implants, galaxies, trees, oceans is composed of only two **“elementary particles”**, the **QUARKS** and the **LEPTONS**. During the Big Bang there were six types of each in pairs. Only a few, one pair of quarks (up-quark, down-quark) and one pair of leptons (the electron and the neutrino) are among the more significant elementary matter particles today.

Due to interactions between the elementary particles, forces are produced, 4 in all.

1. Gravitational force
2. Electromagnetic force
3. Strong force
4. Weak force

For each type of force is a “force carrier particle”, graviton, photon, gluon and weak bosons respectively. Other than these four fundamental forces there is no other force in the universe.

Added to these elementary matter particles and force carrier particles is the **“Higgs boson”** nicknamed the **“God Particle”** by Leon Lederman. The God Particle pervades the whole universe making up the “Higgs Field”.

Passing through the Higgs Field, the elementary particles (except photons) gain mass into all the elements and matter in existence. The quarks and leptons are thus the basic building blocks for building ATOMS and everything in the universe, including the “Earth”, “Fire”, “Air” and “Water” of EMPEDOCLES.

Quarks interact to form protons and neutrons, leptons interact to form electrons and neutrinos.

- 3 quarks make 1 proton
- 2 leptons make 1 electron

An electron added to proton makes an atom (Hydrogen), different combinations in different proportions making up different atoms for the various molecules of all the elements in the universe.

Quarks and leptons also interact by exchanging force carrier particles. From among the four force carrier particles it is the photons in the electromagnetic force that charges the ions.

CHELATION means the bonding due to electrical attraction between oppositely charged ions resulting in **Ionic Bonding**. Because the oxide surface of the implant is positively charged, the charged particles reach deeper into, get entangled, attract and bond with oppositely charged ions in the matrix.

ADHESION also being an intermolecular

attraction by electromagnetic forces is due to the difference in potential energy by the force carrier particles, photons on the interface generating electric and magnetic forces. The bond by adhesion is superficial. There is no dissolution of one element into another, the ions or molecules are not entangled, the linkage is only in the interface, only superficially.

Whereas in CHELATION, the ions or molecules are entangled one in another, the elements in the implant complex such as Calcium, Phosphorus, Tio₂ remain unchanged, there being no chemical reaction.

Adhesion is adherence by adsorption which means adherence of only a thin layer on the surface, the elements being not dissolved one into another. In CHELATION the adherence reaches up to deeper layers by dissolution of ions into the molecular structure of **chelators** in the matrix.

MATRIX which is purposeful for its chelating agents (enzymes, proteins, virtually all biochemicals) can be assumed to present two interfaces, one against Tio₂, the other against osseous deposit. Chelation concerns the interface between the metal (the oxide surface) and the matrix. The other interface against the tissue being blood supplied would simulate skin grafting or organ transplanting.

As much as bonding agents are chelators for dentists, organic compounds such as amino-acids, enzymes, polypeptides, polysaccharides in the tissue fluid around the implant are for implantologists, affording ligands for titanium cat-ions in the oxide surface.

REFERENCES

1. The Invention and Discovery of the 'God Particle', HIGGS. Jim Baggott. University Press 2012.
2. The God Particle, Leon Lederman, Nobel Laureate, with Dick Teresi. A Mariner Book, Houghton Mifflin Company. Boston New York 1993.
3. Beyond The God Particle, Leon Lederman, Nobel Laureate, with Christopher Hill. Prometheus Books, 59 John Glenn Drive, Amherst, New York 14228-2119, 2013.