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THE EDITOR'S CORNER

Is There a Golden Ratio?

The Discovery Channel recently presented a BBC series of four programs called "The Human Face". In it, beauty and human attractiveness were related to the Golden Ratio, which for centuries has been thought by many to represent perfect harmony, or the most attractive proportion in almost all things. Some have called it the Divine Proportion.

This ratio may have been discovered by the Greek mathematicians Pythagoras and Euclid. For a long time it was considered a standard for musical composition. Mozart was an adherent. In architecture, Greek and Roman buildings including the Acropolis and the Pantheon apparently were designed to the Golden Ratio. In modern times, Le Corbusier used it in architectural design. In art, Da Vinci and Durer applied the ratio to the human face and form, and both made diagrams illustrating the concept (see the cover of this issue). Da Vinci is said to have applied the ratio to his paintings—including the Mona Lisa, where not only the face, but also the rest of the body, may have been formed according to a golden rectangle. These are but a few applications of the Golden Ratio to patterns of harmony and beauty. Examples abound in nature, for both plants and animals.

Dentists and orthodontists have used an instrument called the Golden Divider to identify golden relationships in the human face and teeth. The instrument expands, pantograph style, maintaining a Golden Ratio between its two interlocking calipers. Dr. Robert Ricketts, in a JCO article on the Golden Divider, demonstrated some of the golden relationships in the face, teeth, and skull that may contribute to the beauty of the human face.* In the television series, a more sophisticated mathematical and geometric representation of the human face was shown, based on the work of Dr. Stephen R. Marquardt, Chief of Research in Facial Imaging at UCLA.

The Golden Ratio is usually expressed as 1:1.618, which is actually an abbreviation of what is called an irrational or infinite number—1.6180339887498948482 . . .

*Ricketts, R.M.: The Golden Divider, *J. Clin. Orthod.* 15:752-759, 1981.

Since this is a mathematical construct, one wonders if 1:1.6 would not make an adequate measurement, especially considering the relative crudeness of the Golden Divider. One also wonders why we need to identify a Golden Face at all, although there is some basis for the position that the more golden relationships a face has, the more attractive it is. The Golden Ratio could be taken into consideration in plastic surgery or in making adjustments in the size and shape of teeth, but concepts of facial beauty have varied among races and over the course of time. In the 1920s, the "movie star" face had a small, thin-lipped mouth. The preferred face among leading models today appears to have a short upper lip and a pouty mouth with protruding lips and teeth. An orthodontist would probably be unhappy with such a result.

Some of the golden relationships observed in nature may be more compelling than subjective conclusions about what constitutes harmony in design. There is not, for example, universal agreement that symmetry creates the most pleasing design, and in some cases mere coincidence may apply to an apparent relationship. This may be true of efforts to relate the dimensions of the Egyptian pyramids to the Golden Ratio. Great as that civilization was, it dealt in cubits, not mea-

surements carried to three decimal places. That does not rule out the notion that the builders of the pyramids independently chose a design whose harmony was close to the Golden Ratio. Other supposed relationships to the Golden Ratio are even more suspect. A website makes a case for the appearance of the Golden Ratio in the wagers made at thoroughbred and harness race tracks for win and place. This led to the conclusion: "We suggest that race wagering markets self-organize towards the Golden Section to optimize resource allocation of money." Don't bet on it.

Although many measurements in living things that approach the Golden Ratio seem to make agreeable combinations, it would be exceeding the extent of our present knowledge to ascribe this to a natural plan, or to demand relationships as precise as 1:1.618. Still, with so many fine minds having believed in the Ratio over the past 2,500 years, its relevance cannot be ruled out. As the genetic code becomes better understood, one unexpected finding may be that there is a genetic basis for the Golden Ratio in biology and botany. Wouldn't it be a revelation if beauty were not actually in the eye of the beholder, but in an inherited Golden Ratio?

ELG

APPLICATIONS FOR JCO EDITOR

Applications are being accepted for the position of Editor-in-chief of the *Journal of Clinical Orthodontics*. Duties include solicitation, evaluation, and production of clinical articles, editorials, interviews, book reviews, and other material; editing and proofreading in cooperation with JCO staff; supervision of editorial board; representing JCO at meetings and conferences. Applicant must be a practicing, Board-eligible orthodontist. Computer literacy required. Dental journalism experience helpful, but not mandatory. Editor not required to relocate. Compensation commensurate with duties. Send C.V. and supporting material to David Vogels, Managing Editor, JCO, 1828 Pearl St., Boulder, CO 80302. All applications will be held in confidence.