

# Is Autogenous Bone Still the “Gold Standard” in Oral Bone Grafting?

Before answering this question, one must review the origin and evolution of the term “golden standard”. In 2005, Claassen, JA stated, “whereas the gold standard was never regarded as infallible, the incorrect term golden standard implies a level of perfection that is unattainable in medical science.”<sup>1</sup> Consequently, the correct terminology is **gold standard**.

The concept of a gold standard is derived from a monetary system where the value of the standard economic unit of account (currency) is based on a fixed quantity of gold. In 1971 the United States unilaterally terminated the conversion of the US dollar to gold, ending the Bretton Woods Agreement and the system of international currency exchange. The US dollar was thus turned into fiat money which is a mode of currency conversion not backed by a commodity.

This brings the question; what is implied by the term “gold standard” in oral bone regeneration? In a 2010 editorial and a 2015 publication, Misch, CM stated: “From a biologic perspective, autogenous bone remains the gold standard for bone graft materials.”<sup>2, 3</sup> The author further summarized that autogenous bone is associated with greater volume gains and superior quality. Returning to the definition of “gold standard” (a currency supported by the commodity gold) the “currency” here is autogenous bone and the “commodities” backing the currency are better bone volume and quality. This however raises the question of what constitutes better bone quality.

A PubMed search using the key words “bone quality assessment” found multiple results in the orthopedic literature. Quality was assessed by the bone’s susceptibility to fracture and capacity to turnover especially in conditions of osteoporosis. When the terms “bone quality assessment in oral bone grafting” are used, the results include review papers on histomorphometric findings and/or survival of dental implants in alveolar guided bone regeneration procedures or sinus augmentations. The use of various grafting materials including autogenous bone, allografts, alloplasts and xenografts were compared, and the results found that bone substitutes either performed in a like manner or superior to autogenous bone used alone.<sup>4,5</sup> Furthermore, these positive results had the added major benefit of eliminating the second surgical site morbidity associated with harvesting autogenous donor grafts.

The equal or superior findings are due principally to biotechnological improvements that bone substitutes have undergone in the previous two decades. Improvements in the allograft group include: (i) variety of particle sizes, (ii) density mixtures and (iii) exploiting the qualities of cortical and/or cancellous bone separately or in combination. These improvements have led to: (i) favorable bone quality, (ii) improved bone volume, (iii) lower material costs, (iv) more efficient surgical time, (v) absence of risk of disease transmission or antigenicity, (vi) less morbidity, and (vii) greater predictability especially in the repair of large defects. These were the same parameters used to label autogenous bone as the “gold standard”.

In conclusion, the specialty of implant dentistry needs to do what the Federal Reserve of the United States did and terminate the association of autogenous bone to the “gold standard” and let the science and biology of bone substitutes float as a “fiat currency”. This would promote the evolution of bone grafting materials and allow more patients to be treated successfully and comfortably, while respecting the fundamentals of wound healing that never change.

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