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Letter to the Editor

The place of direct metal laser sintering (DMLS) in dentistry and the importance of annealing

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Dear Editor:

We read with great interest the recently published article, "Structural characterization of biomedical Co–Cr–Mo components produced by direct metal laser sintering", by Barucca et al. [1], in which the authors aimed to investigate the microstructure of the biocompatible Co–Cr–Mo alloy which was manufactured by direct metal laser sintering (DMLS) technique in order to correlate their hardness behavior. It was reported that the Co–Cr–Mo products of DMLS are harder than the conventionally produced ones and this would make them suitable for use in surgical implant, especially in places where a high degree of personalization is required. The authors' findings for phase transformation status and microstructural characterization of the samples that were manufactured by the DMLS technique provide novel data for academics in this field. However, there are some important points I would like to add, as we previously published a DMLS study in another journal [2].

The manufacturing techniques of Co–Cr alloys in dentistry are casting (conventional), milling, and, in recent years, DMLS. In dentistry, DMLS is a new but increasingly widespread technique used in dental routines both for removable and fixed partial dentures. In the last three years, our department has only used the prosthetic frameworks manufactured by the DMLS technique due to their ease in manufacturing and cost effectiveness. However, this technique is still very new for many clinicians manufacturing Co–Cr metal ceramic substructures, and therefore, the steps of the procedure and the factors that affect product quality are not well known. In our paper, we aimed to present the micromechanical properties of Co–Cr samples that were manufactured by the DMLS technique and the importance of the laboratory procedures for biological and mechanical factors [2]. As we outlined in our study, the annealing process is an inevitable step for the clinical use of these products. Before annealing, the mechanical structure of the products is brittle and hard; the micromechanical structure also differs from the annealed ones. The increased hardness of the metals may suggest the increased inner stresses after manufacturing. The results of Barucca et al.'s [1] TEM investigation are interesting for the understanding of these products' micromechanical structure after manufacturing. However, we observed that under a noble gas atmosphere, the hardness decreases because of the decreased oxidation level. This acquired specification also increases the manipulability of the metal structure. Furthermore, I would like to specify the following: a high quality product usually requires a bright finish, which is well known in an oral environment to reduce bacterial accumulation [3]; thus, the use of an inert atmosphere is critical for the appearance of the finished product in dentistry [4]. For this reason, it could be recommended that the authors investigate the mechanical and structural properties of the Co–Cr–Mo alloys fabricated in the DMLS technique after the annealing process.

Conflict of interest

The author reports no conflicts of interest. The author alone is responsible for the content and writing of the paper.

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