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Association between mouth-breathing and atypical swallowing in young orthodontic patients at Egas Moniz Dental Clinic

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Figure 2. Post-sintering public domain molar tooth prototype printed using the using the 88 wt.% solid slurry next to an unrelated extracted tooth for comparison. The sliced 3D prototype tooth model used is shown in the rightmost picture.

Results: The best sample print quality was attained using 88 wt.% solid content slurries, which resulted in minimal microscopic sintering defects and no extrusion faults due to transient clogging of the extrusion nozzle, thus reaching a sintered density 97% that of theoretical. A full-size tooth prototype was successfully fabricated using the 88 wt.% solid content slurries Figure 2.
Discussion and conclusions: The 88 wt.% solid content slurry showed increased viscosity, consistently raising extrusion pressure and shear stresses which likely broke-up any soft agglomerates, thus avoiding temporary nozzle clogging and the formation of agglomerate-related sintering defects. The 90 wt.% slurry showed near-dilatant behaviour, possibly possessing harder agglomerates. Thus, sintered sample parts with 97% theoretical density were realised from an 88 wt.% plain water-based slurry with no binders or plasticisers that would otherwise require an additional pre-sintering burnout stage and likely generate sintering defects.

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References

[1] Faes M, Valkenaers H, Vogeler F, et al. Extrusion-based 3D printing of ceramic components. Procedia CIRP. 2015;28: 76–81.
[2] Xing H, Zou B, Li S, et al. Study on surface quality, precision and mechanical properties of 3D printed ZrO2ceramic components by laser scanning stereolithography. Ceram Int. 2017;43(18):16340–16347.

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Association between mouth-breathing and atypical swallowing in young orthodontic patients at Egas Moniz Dental Clinic

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ABSTRACT
Introduction: Breathing and swallowing are functions of the stomatognathic system, since they are vital and innate to the human being, moreover, interrelated [1,2]. Most of the breathing is nasal, however mouth-breathing can occur, being a pathological adaptation that can lead to a series of changes, often irreversible, in the growth and development of a child, for instance causing changes in swallowing [3]. This mechanism differs between children and adults and, if identified in a child, up to five years, it is considered as infantile deglutition pattern being replaced by mature deglutition pattern after this period [4]. If it continues beyond the period in which it is considered normal, it is renamed as atypical [5]. Therefore, the aim of this study was to explore the possible relation between mouth-breathing and atypical swallowing in children.
Materials and methods: The study took place between January 2018 to February 2019, involving patients referred to the Care Consultation of Orthodontics Egas Moniz Dental Clinic (EMDC). The sample consisted of 86 patients, that $n = 46$ (53.4%) were females and $n = 40$ (46.6%) were males, with a mean age of 12.3 years. The study was approved by an

Ethics Committee of Egas Moniz. Inclusion criteria were: children of both sexes aged 5–18 years, having clinical record at EMDC and with the correspondent informed consent signed by the parents. Exclusion criteria were: children who had past orthodontic treatment and having craniofacial anomalies or syndromes. The method used to assess breathing and swallowing patterns was adapted by Marchesan [2]. Data were analysed by using descriptive and inferential methodologies (chi-square test). A significance level of 5% was established in the latter case.
Results: A higher prevalence of mouth-breathers was found in women $n = 49$ (56.5%) than in men $n = 37$ (43.5%). Atypical swallowing, was also more prevalent in women $n = 48$ (56.1%) than in men $n = 38$ (43.9%), however, in both cases, the differences were not found to be statistically significant ($p = .594$, $p = .570$). $n = 52$ (83.9%) of the mouth-breathers were identified as having atypical swallowing, conversely to $n = 14$ (58.3%) of the normal (nasal) breathers. Overall, there was a statistically significant association between mouth-breathing and patients with atypical swallowing ($p = .012$).
Discussion and conclusions: The results show that mouth-breathing and atypical swallowing were found to be significantly associated $n = 52$ (83.9%) in this study, being closed to Lemos et al. who found higher results (97.2%) [1]. Other studies reported that is not statistically significant the association between mouth-breathing and atypical swallowing [6]. The results of this study are clinically relevant and encouraging the search for early diagnosis and intervention.

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References

[1] Lemos C, Junqueira P, Gomez M, et al. Study of the relationship between the dentition and the swallowing of mouth breathers. Int otorrinolaringol. 2006;10(2):114–118.
[2] Andrade F, Araújo A, Ribeiro C, et al. Alterações estruturais de órgãos fonoarticulares e más oclusões dentárias em respiradores orais de 6 a 10 anos. *Respiração oral e sistema estomatognático*. Rev CEFAC. 2005;7(3):318–325.
[3] Matsuo K, Palmer JB. Coordination of mastication, swallowing and breathing. Jpn Dent Sci Rev. 2009;45(1):31–40. 1
[4] Ambrosio AR, Trevilatto PC, Sakima T, et al. Correlation between morphology and function of the upper lip: a longitudinal evaluation. Eur J Orthod. 2009;31(3):306–313. Jun
[5] Di Vecchio S, Manzini P, Candida E, et al. Froggy mouth: a new myofunctional approach to atypical swallowing. Eur J Paediatr Dent. 2019;20(1):33–37. Mar
[6] Maspero C, Prevedello C, Giannini L, et al. Atypical swallowing: a review. Minerva Stomatol. 2014;63(6):217–227.

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Study of quantum dots (CdS, ZnS) toxicity in *Danio rerio*: preliminary results

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ABSTRACT
Introduction: Quantum Dots (QDs) are nanoparticles with potential applications in many industrial and biomedical areas (e.g. fluorescent dyes, LED). QDs have unique and remarkable properties, however, little is known about their toxicity [1]. Zebrafish (*Danio rerio*) has been the first vertebrate model in many research areas and is recognised as a good model in nanotoxicology [2]. This work aims to evaluate the toxicity of QDs (CdS and ZnS) in *D. rerio*, singly and combined, by determining a set of biomarkers (e.g. antioxidant enzymes).
Materials and methods: Adult zebrafish ($n = 50$ ($\times$ 2); 0.3 ± 0.1 g weight; 2.7 ± 0.4 cm) were distributed by 4 glass containers (1 L) and exposed to different concentrations of QDs (0 ppb, 10 ppb, 100 ppb and 1000 ppb), for 7 days. Trials were performed in duplicate using 3 different groups exposed to: (1) ZnS-QDs, (2) CdS-QDs), (3) (ZnS-QDs + CdS-QDs). Oxidative stress was assessed by measuring catalase (CAT), glutathione-S-transferase (GST), lipid peroxidation (LPO), superoxide dismutase (SOD) and Total Antioxidant Capacity (TAC), as described previously [3,4]. Trials followed the 3Rs and animal welfare and were authorised by national authorities. Statistics was carried out using the Kruskal-Wallis test (STATISTICA 8.0, USA).
Results and Discussion: Results show no significant differences between the 3 groups of experiments. Regarding enzyme activities (nmol/min/mg tot. protein), CAT the highest levels in fish exposed to 100 ppb Zn-QDs (45 ± 2) and the lowest levels were measured in controls (26 ± 4). GST showed the highest GST levels in fish exposed to 10 ppbZn-QDs (50 ± 1) and lowest levels in fish exposed to 1000 ppbCd-QDS (27 ± 16). SOD results (as % inhibition/mg tot. protein) showed highest values in fish exposed to 10 ppb QDs combined ($89 \pm 3\%$) and lowest levels in fish exposed to 100 ppb of Zn-QDs (35 ± 9). CAT, GST and SOD showed higher levels in fish exposed to 10 ppb and 100 ppb QDs. LPO showed non-sgnificant diferences TAC showed a trend to decrease in all groups exposed to different concentrations of QDs.