Response to Letter to the Editor Concerning “Quantitative Evaluation of Mechanical Properties in Tissue-Engineered Auricular Cartilage”

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Response to Letter to the Editor “Practical Considerations in Auricular Cartilage Tissue Engineering”

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Firstly, we would like to thank Dr Hong and colleagues for their comments and for highlighting the practical considerations of auricular reconstruction from a clinical standpoint. Our main goal was to indicate the importance of evaluating the mechanical integrity in TE constructs for auricular cartilage.

Dr Hong and colleagues are correct in stating that surgical reconstruction with autologous cartilage is not the only existing treatment for auricular cartilage defects. It was the intention of this statement in the original text to highlight that ear cartilage is not (cannot) be used, and other materials need to be found. Specifically, we wished to emphasize that ear cartilage tissue does not regenerate, and therefore patients have to undergo surgery where a replacement material is introduced. To this end, a TE approach could be one such option. As later stated, we understand that alloplastic implants are also used (1-6).

We strongly believe that the elastic nature of auricular cartilage *does* serve an important functional role. From a daily use scenario, the ability of the ear to return to its original form upon loading (sleeping, wearing glasses, headphones or helmets) is directly related to the material properties of the tissues of the ear. In fact, qualitatively, flexibility and shape maintenance (7-21) are the current considerations for evaluation of a successful auricular cartilage replacement material. It was our aim to take this qualitative approach and highlight the tissue components that could drive this mechanical competency, and furthermore how this could be assessed quantitatively.

In agreement with Dr Hong and colleagues, we believe that the surgical considerations (e.g skin stretching requiring a firm material during implantation as well as hyperflexion of the helical rim) cannot be overlooked, however we also understand that the age of implantation is mainly dictated by the size of the available cartilage, rather than its mechanical properties (1, 22). In such a young field (i.e. auricular cartilage tissue engineering), and with so little information available on the relevant mechanics: in daily use, in surgery, post-surgery, and in relation to neighbouring tissues like skin; we believe it is premature to state that mechanical function is not of interest. In agreement with the letter, we hope through a process of interdisciplinary dialogue and a multidisciplinary approach we can create a solution that allows for ear replacement technologies that provide patient satisfaction, take in practical surgical

considerations, and potentially, allows for organ-level (including skin, cartilage, fat, muscle, bone, blood vessels) tissue engineered ears.

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